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PART IV

FEDERAL ENERGY ADMINISTRATION

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ENERGY AUDIT PROCEDURES

Proposed Rules and Public Hearings

FEDERAL ENERGY ADMINISTRATION

[10 CFR Part 450]

ENERGY AUDITS

Proposed Procedures

AGENCY: Federal Energy Administration.

ACTION: Notice of Proposed Rulemaking and Public Hearings for Energy Audits.

SUMMARY: FEA proposes to designate, by rule, the types of, and requirements for, energy audits, as required by the Energy Conservation and Production Act. The proposal also includes certain criteria and projections of future energy prices which FEA would use to identify energy conservation measures and renewable-resource energy measures. The intended effect of this solicitation of views and data is to provide FEA with information relevant to the development of final regulations on the types of, and requirements for, energy audits.

DATES: Comments by May 13, 1977, 4:30 p.m., e.d.t.; requests to speak at National hearing by April 25, 1977, 4:30 p.m., e.d.t.; requests to speak at other hearings by the times indicated in Comment Procedures, below.

ADDRESSES: Comments and request to speak at the National hearing to: Executive Communications, Box LQ, Room 3309, Federal Energy Administration, Washington, D.C. 20461.

National hearing shall be held May 10 and, if necessary, May 11, 1977, 9:30 a.m. e.d.t., Room 2105, 2000 M Street N.W., Washington, D.C. 20461.

Regional hearings shall be held at the times and places indicated in Comment Precedures, below.

FOR FURTHER INFORMATION CONTACT:

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I. Introduction

The Federal Energy Administration (FEA) proposes to add a new Part 450 to Chapter II of Title 10, Code of Federal Regulations (CFR), to designate, by rules, types of, and requirements for, energy audits, under Section 432(d), 42 U.S.C. 6325(e)(2) of the Energy Conservation and Production Act (Act), Pub. L. 94-385, 90 Stat. 1125 et seq.

FEA also is including in this part its proposed projections of future energy prices. These projections will be used in calculating the changes in energy costs which will result from installing a particular modification in an existing building or industrial plant. This regulation also includes criteria FEA will use to determine whether the installation of a particular modification meets requirements of the Act for designation as an energy measure.

II. Uses of Energy Audits

The proposed regulation prescribes requirements to accomplish the following purposes—

1. To establish minimum requirements for the type of energy audits to be carried out as part of a supplemental State energy conservation plan, proposed guidelines for which were published in the Federal Register on March 25, 1977 at page 16150 et seq.;

2. To measure the energy and cost savings to be derived from the installation of an energy measure; and

3. To provide a process to identify a modification of a building or industrial plant as an energy measure for purposes of the Act.

FEA at this time is proposing two types of energy audits—information audits for the first purpose and verification audits for the other two purposes. FEA may develop additional types of energy audits at a later date.

III. Qualifying Conditions

Proposed § 450.4 includes criteria FEA will use, in reviewing the results of an energy audit, to determine whether a modification meets certain conditions specified in the Act as necessary for designation as an energy measure.

For designation of a modification as an energy conservation measure or a renewable-resource energy measure, FEA must determine that installation of the modification is likely to reduce energy costs in an amount sufficient to enable a person to recover the total cost of purchasing and installing such modification within its attributed life. The information provided by a verification audit will enable FEA to measure the extent of energy and cost savings and to determine whether these savings are sufficient to meet this cost recovery test.

This proposed section also contains projections of future energy prices which will be used in carrying out verification audits for calculating the changes in energy costs projected to result from installing a particular modification in an existing building or industrial plant.

In addition, for designation as an energy conservation measure, the Act requires that FEA must determine that installation of the modification (1) has as its primary purpose an improvement in the efficiency of energy use and (2) will not result in any conversion from one fuel or source of energy to another which is of a type which FEA determines, in accordance with this part, is ineligible on the basis that such type of conversion is inconsistent with national policy with respect to energy conservation or reduction of imports of fuels. This proposed section sets forth the standards by which FEA will determine whether the primary purpose of a modification is an improvement in energy use efficiency and whether it will result in an ineligible fuel conversion.

A. Energy Price Projections

In accordance with the definitions of energy conservation measure and renewable-resource energy measure in Section 431 of the Act, FEA has provided energy costs reasonably projected over time as Appendix A to this proposed regulation. These take the form of price projections for electricity, liquefied petroleum gas (LPG), natural gas, distillate fuel oil, residual fuel and coal for each of the 10 FEA regions through the year 1991. For price projections for years beyond 1991, 1991 prices will be used. Proposed § 450.4(d) requires that prices be derived by using the projected prices provided in Appendix A, either as shown in Tables 1-20, or by adjusting these prices for a particular user by using prescribed alternate formulas. Proposed § 450.21(c) requires that prices derived in accordance with proposed § 450.4(d) be used for verification audits.

FEA's projected energy prices are developed from the March 30, 1977 Reference Case results of the Project Independence Evaluation System (PIES). PIES is an integrated model of the domestic energy system with explicit representation at the regional level of supplies and costs of petroleum products, gas, and coal; costs of petroleum refining, electricity generation, and energy transportation; and price sensitivity of energy demands. Although new cases are being prepared by FEA, this Reference Case was selected as the currently available future case best reflecting current laws and regulations, thus requiring little conjecture regarding future legislative actions. Specific assumptions under which the Reference Case is prepared are:

1. Real annual growth rate for the Gross National Product (GNP) will average 5.0 percent to 1980, 3.4 percent from 1980 to 1985, and 3.0 percent from 1985 to 1990.

2. Legislation and policies in effect as of November 1976 will continue, including—

(a) Domestic composite crude oil prices will rise at a rate of 10 percent per year.

(b) Most of the major conservation programs included in the Energy Policy and Conservation Act of 1975 will be carried out.

(c) FPC Opinion 770, which increased prices of interstate natural gas, will remain in force.

(d) Import oil prices will remain constant in real terms.

The projection techniques have been developed to be used for a number of critical FEA forecasting purposes. These projections are expected to be revised as better information becomes available.

Also proposed are formulas by which individual building and industrial plant owners or operators can adjust the regional average prices to reflect the difference between their actual base year price and the regional average base year price.

FEA is particularly interested in receiving comments on the applicability and implications of these fuel price projections and the price adjustment formulas.

B. PRIMARY PURPOSE

The Act requires that the "primary purpose" of an energy conservation measure is to be an improvement (characterized in the proposed regulations as the result of a "modification") in efficiency of energy use, as determined by FEA. Proposed § 450.4(a) reflects FEA's determination that if the costs of the purchase and installation of a modification will be recovered by the projected energy cost savings to be attained over the attributed life of such modification, the primary purpose for an energy conservation measure will have been met.

Two other approaches to "primary purpose" were considered and rejected. One approach would be to determine whether the energy cost savings of the modification would comprise some significant proportion of the total cost savings resulting from use of that modification. Such an approach would allow FEA to support modifications for which energy savings were only one of several desirable benefits. However, FEA decided that the determination of any given percentage of total costs would be arbitrary, complex and difficult.

A second alternative approach would be to determine whether energy efficiency is the primary purpose of any given modification on a case-by-case basis. FEA decided that such an approach would provide inadequate guidance to building and industrial plant owners, and would be both time-consuming and costly to implement.

FEA is interested in receiving comments on the feasibility and implications of its approach in proposed § 450.4 (a) to determining primary purpose.

C. INELIGIBLE FUEL CONVERSION

As reflected in proposed § 450.4(b), FEA finds, as required by the Act, that any modification that results in an increase in the consumption of petroleum products, natural gas, or a combination of these, at the building or industrial plant site cannot qualify as an energy conservation measure because it is inconsistent with national policy or with respect to reduction of import of fuels.

Although coal is currently perceived by FEA as a depletable energy resource, a conversion to coal has been determined by FEA to be acceptable since such a conversion would not increase and may reduce the import of fuels.

One alternative considered and rejected would have required that the energy consumption impacts of each modification be traced back to the original fuel source. Under this alternative, end-use electricity consumption would have had to be converted to power plant energy consumption and then analyzed in terms of the fuels (e.g., gas, oil, coal, nuclear fuel) required to generate this electricity. While an analysis of this type would enable FEA to make an ideal determination of the modification's net impact on the consumption of imported fuels, FEA does not feel that sufficient information exists to allow such analysis to be undertaken or reviewed in a technically sound and consistent manner. Accordingly, in general, FEA will judge the fuel conversion impacts of proposed modifications at the point of use on site.

The only exceptions that FEA will review, on a case-by-case basis, are those that involve the installation of dual-purpose power plant equipment as provided in proposed § 450.4(c). In addition to the fact that such modifications have a salutary impact on the efficiency of energy use at the site, the equipment used has by-products, such as process steam or electricity, which in many cases can be used elsewhere and thus can reduce the consumption of imported fuels. Accordingly, the installation of a dual-purpose power plant may qualify as an energy conservation measure even if its installation increases the consumption of petroleum products at the user site. However, FEA will require that the energy audit submitted for case-by-case review of such a modification demonstrate that an off-setting reduction in the consumption of petroleum products occurs at a utility power plant or other location where the useful by-products of the equipment are used.

FEA is particularly interested in receiving comments on its proposed approach in § 450.4(b) to determining ineligible fuel conversions and the practicability of its procedures for assessing dual-purpose power plant equipment on a case-by-case basis as proposed in § 450.4(c).

IV. Information Audits

Proposed subpart B establishes the classes and requirements for the conduct of information audits and the qualifications of persons conducting and the cost of information audits. This subpart establishes the minimum criteria for information audits to be carried out by a State under a supplemental plan eligible for Federal financial assistance. A program for supplemental plans is established under Part B, Title IV of the Act.

On March 25, 1977, FEA published in the Federal Register proposed supplemental State energy conservation plan guidelines, 42 FR 16150. The proposed guidelines pursuant to the Act mandate three program measures, one of which calls for energy conservation efforts by a State to encourage and carry out energy audits. The guidelines provide for the use of three types of information audits—Classes A, B, and C.

Proposed § 450.11 establishes these three classes of information audits and their requirements, and proposed § 450.-12 establishes the information to be contained in each type. Class A information audits require a qualified energy auditor to conduct an on-site energy audit of a particular building or industrial plant. Class B information audits require a State-provided questionnaire and State-sponsored analytical process that would enable the owner, operator or occupant of a building or industrial plant to analyze the likely effects of certain modifications on reducing energy consumption. Class C information audits require State-provided workbooks to enable the owner, operator or occupant of a building or industrial plant to conduct a "do it yourself" information audit.

While subpart B of the regulation applies only to information audits conducted in implementation of supplemental plans, it is not the intent of these rules to suggest that an information audit can be carried out only by, or with the approval of, a State. Parties desiring to assess modifications for saving energy in their buildings or industrial plants may consider this regulation as providing useful guidelines for making such assessments.

The proposed guidelines for supplemental plans provide that Class B or C audits shall be available to all individuals who are occupants of residential dwelling units in the State at no direct cost to those persons. Furthermore, the proposed guidelines require that no Federal financial assistance provided for a supplemental plan be used to pay auditors to perform Class A energy audits.

FEA wishes to provide each State with the maximum latitude and will not require the stringent procedures prescribed for verification audits. However, prior to issuance of a grant, a State's procedures shall be included in its supplemental plan submitted to FEA for review and approval.

V. Verification Audits

Proposed subpart C prescribes guidelines for building and industrial process verification audits. A verification audit provides detailed analysis of the changes in energy use and costs likely to result from the implementation of modifications. All audits carried out for the purposes set forth in proposed § 450.2, with the exception of audits carried out as elements of supplemental plans, will be of the verification audit type, although a State may choose to prescribe the use of a verification audit in its supplemental plan, if desired.

FEA shall use the findings of a verification audit to determine that a site-specific application of a modification which is not an approved energy measure meets the requirements for an energy measure. An energy measure is "approved" if it is on a list of energy measures published by FEA pursuant to Section 365(e)(1) of the Energy Policy and Conservation Act. A verification audit may also be required by FEA or other Federal agencies in the administration of a particular Federal program. If Federal programs are developed to foster the installation of energy measures, the administering Federal agency may use an energy audit to provide an appropriate analysis of the costs, energy use changes

and energy cost changes associated with a particular modification to an existing building or industrial plant.

A verification audit shall be site-specific, performed as prescribed in proposed § 450.21, conducted by an auditor who is qualified in accordance with proposed § 450.22, and conducted at no cost or at a reasonable cost to the owner, operator or occupant of a building or industrial plant as provided in proopsed § 450.23. A distinction is made between a verification audit of a building and that of an industrial process, where appropriate.

Proposed § 450.21 prescribes requirements for (a) describing the energy consumption of a building system or industrial process system before implementing a modification; (b) considering the effects of modifications which will result in reducing energy costs; (c) computing the costs of purchasing and installing a modification and the resulting energy savings, improvements in the efficiency of energy use, and energy cost savings; and (d) reporting on the findings of a verification audit.

A. SCOPE OF REPORTING REQUIREMENTS

The reporting requirements for a verification audit are not designed to povide proof that the measure which is the subject of the audit is the most cost-effective option available. Such a requirement would be burdensome, costly, and time-consuming. Instead, proposed § 450.21(b)(3) requires that the audit identify all modifications considered as an alternative to the modification which is the subject of the audit.

More explicitly, there is a further reason for choosing not to require a detailed assessment of alternative modifications that might reduce energy consumption. FEA has no desire to set up an application and review process that would require complex Federal supervision, impose higher costs by prescribing that an open-ended number of options be analyzed and reported on using rigorously defined procedures, and increase the likelihood of delay.

By requiring that the audit identify other modifications that have been considered, FEA assumes that there will have been appropriate consideration of other modifications in any event.

FEA is particularly interested in receiving comments on the proposal in § 450.21(b)(1) that only the measure being considered undergo detailed analysis in a verification audit.

The verification audit procedures are not intended to prescribe a methodology for conducting a sophisticated cash flow analysis that will determine for each building or industrial plant whether the installation of the particular modification would be a prudent management decision. Verification audit procedures are intended solely to provide a consistent technique to assess the cost and energy savings of energy measures consistent with FEA determinations discussed in proposed § 450.4.

This approach has been taken not only because it is impossible to develop a general methodology that would be appropriate in all cases but also due to a variety of statutory requirements regarding the analytical approach. For example, the Act provides that the reduced energy costs should be sufficient to recover the total cost of purchasing and installing the measure without regard to any tax benefits. Clearly, from a business standpoint, the prudent manager will consider the tax implications of implementation. Therefore, some financial analysis in addition to the verification audit will be necessary for an appropriate evaluation of the financial soundness of implementation of a modification.

B. PURCHASE AND INSTALLATION COSTS

Section 431 of the Act specifies that for a modification to be eligible for designation as an energy measure, it must be established that the modification is likely "to reduce energy costs * * * in an amount sufficient * * * to recover the total costs of purchasing and installing such measure * * *."

Under proposed § 450.21(d)(1) FEA proposed to include in the total costs of purchasing and installing a modification the costs associated with purchasing and installing it, including principal and interest payments on debt incurred, less the salvage value of any equipment being replaced. Also included are the costs of purchasing and installing those replacements of significant components and parts necessary to the achievement of the modification's attributed life, less the costs of replacing existing equipment or its significant components which would have been required—over the modification's attributed life—had the modification not been installed. FEA includes the cost of replacing significant components and parts (e.g., the compressor on a heat pump) as these replacement components then become integral parts of the installed modification.

Not included in total costs are the operation and maintenance costs associated with a modification as compared to those which would have been incurred had the modification not been implemented. If changes in maintenance costs associated with the modification were to be excessive (e.g., greater than 2 percent of the purchase and installation costs for each year of the attributed life of the modification), their omission could distort the cost computations. However, it would be very difficult to prescribe the nature of those changes which should be analyzed and, in some cases, to conduct this analysis as part of a verification audit. FEA proposes not to require consideration of normal operation and maintenance costs in the conduct of an energy audit.

FEA proposes a computational technique that will adequately account for the items in total costs. The technique requires the conversion to present values of total costs and the future energy cost savings resulting from the modification. The present values of costs are subtracted from the present values of energy savings to determine the net present value of implementing the modification.

FEA proposes to use a simple standard net present value (NPV) technique to determine whether the reductions in energy costs are sufficient to recover, within its attributed life, the total cost of implementing the modification, as defined in this part. The present value of the savings minus the present value of the costs gives the NPV of the investment. The requirement for qualification of a modification as an energy measure would be met if the NPV is not negative for the energy measure's attributed life.

Estimated replacement component costs and the value of energy savings will be expressed in constant dollars, using the same base year as used in Appendix A, FEA's latest projections of energy prices. To convert a future cost savings to present value, the method uses a discounting rate of 10 percent, a rate which represents an estimate of the average rate of return on private investment, before taxes and after inflation as discussed in OMB Circular No. A-94, Revised, March 27, 1972. Principal and interest payments in any time period should be treated just as any other costs to be paid in that time period and discounted to their present value using the 10 percent discounting rate.

This technique can be used by anyone with an understanding of calculating the net present value of future expenditures and savings. It obviates the use of uncertain projections of inflationary or deflationary trends. It permits use of future fuel prices and estimated component and labor costs, and interest costs. The auditor calculating costs thus has a standard method to use in calculating net present value. The use of a 10 percent discounting rate is the normal Federal procedure for comparing receipts and costs that will occur at different times. Accordingly FEA feels its approach is both valid and appropriate.

An alternative technique considered for calculating whether a modification would meet the cost recovery requirements was the use of a variation of the simple payback technique. This would have compared the total energy cost savings (in constant, but not discounted, dollars) over the modification's attributed life to the modification's installation costs, as adjusted by a factor to account for interest accrued for debt incurred to install it. It would have varied from the usual payback approach in that it would not result in an estimate of the actual payback period.

The adjusted costs would be calculated by adding the equal annual payments which would have accrued had a real rate of interest been applied to the principal amount of the loan over its life. For example, for a real rate of interest of 5 percent on a four year, $10,000 loan, the adjusted amount would have been $11,280 $=4\times\$10{,}000\times 282$ (.282 is the capital recovery factor for a 5 percent, four year loan).

This technique has the advantages of giving explicit consideration to interest costs and not requiring the year-by-year discounting of future costs and benefits. However, because this approach does not account for the time costs of money and is inconsistent with standard business

and Federal Government practices for comparing alternative investments, it is not being proposed.

FEA also considered the use of other rates, either for the purpose of discounting future cost savings or for adjusting installation costs.

Consideration was given to using 5 percent so that relatively long-lived modifications might qualify as energy measures, or allowing the use of different rates depending on whether the modifications were to be installed in an industrial plant, commercial or residential building, or a single family dwelling. However, the use of a lower discount rate would be inconsistent with the rate used in conjunction with Federal programs and would not properly reflect the return on investment normally expected in the private sector. The use of different rates of discount for different sectors, FEA felt, would result in needless complication and lead to inconsistencies. For example, the same modification might qualify as an energy measure for one business use and be ineligible for another even if the energy savings were identical for both applications.

FEA is particularly interested in receiving comments on those cost items proposed for consideration in the calculation of total purchase and installation costs; the possible inclusion of operating and maintenance costs in total purchase and installation costs; the method of comparing costs and energy cost savings; and the use of a 10 percent rate for discounting purposes in assessing modifications.

C. COMPUTATION OF ENERGY CONSUMPTION PATTERNS

In establishing improvements in energy efficiency, FEA has specified in proposed § 450.21(b)(4) that they will be determined by comparing the projected annual energy consumption, by fuel type, which would occur if the modification were implemented to that which would occur if the modification were not implemented. The level of conversion from depletable to nondepletable energy resources will be calculated by subtracting the amount of depletable energy consumed with the modification from the amount which is projected to be consumed without it. These calculations will be made for each year of the attributed life of the modification.

FEA recognizes that implementation of other modifications for which Federal program approval is not requested may affect the magnitude of the consumption changes resulting from implementation of the modification for which the audit is being conducted. For example, if in addition to a new furnace, which is the subject of an audit, an owner plans to install insulation, the effect of such insulation must be accounted for when calculating the amount of energy which would be consumed with and without the furnace. Therefore, FEA is requiring that, for verification audits, other modifications to be implemented be identified and described. All such modifications must be taken into account as prescribed by this part in making projections of future energy consumption.

FEA rejected the alternative approach of basing projected consumption without the subject modification on current conditions and comparing it to that which would occur if the subject modification were implemented in combination with other modifications. While this approach has the advantage of being easy to apply, it would not allow a valid determination of the savings that are a direct result of implementing the subject modification and, therefore, would not provide for a valid determination of whether that modification meets the requirements for designation as an energy measure or other program requirements.

However, FEA, in its discretion with respect to a particular program, may consider cumulative energy savings of all modifications to be undertaken in determining whether to provide Federal financial assistance. FEA does not seek to create any disincentives to the implementation of energy measures through private initiative, but endeavors to encourage such actions.

FEA is particularly interested in receiving comments on its proposed technique in § 450.21(b) for calculating the changes in energy consumption patterns attributable to the modification which is the subject of a verification audit.

VI. COST OF ENERGY AUDITS

The Act requires that these rules assure that energy audits carried out pursuant to its provisions impose (1) no direct costs upon individuals who are occupants of dwelling units in any State having a supplemental plan and (2) only reasonable costs, as determined by FEA, with respect to other persons. For information audits, proposed § 450.14(a), and for verification audits, proposed § 450.23(a), require that an energy audit be conducted at no direct cost to the occupant of a dwelling unit.

With respect to an information audit performed for other parties, proposed § 450.14(b) provides that the cost shall not exceed 7 percent of the annual fuel bill. However, a State may prescribe procedures which would permit a greater percentage in exceptional circumstances. FEA is concerned that financial assistance for supplemental plans earmarked to encourage development and use of energy audits be prudently expanded. Imposing additional restrictions upon a State with respect to cost of audits or type of audits was considered. At this time, however, no additional restrictions are imposed to encourage innovation and local initiative, except that the supplemental guidelines prohibit payment of auditors carrying out Class A audits with program funds provided through Federal financial assistance.

Proposed § 450.23(b) limits reasonable costs of verification audits conducted for parties other than those covered by proposed § 450.23(a) to no more than 7 percent of the annual cost of energy used in the building or industrial plant, except in those cases where FEA finds, on the basis of case-by-case review, that the audited building or industrial plant exhibits truly unique or unusually complex characteristics.

In developing this standard for reasonable cost, FEA considered the options of relating reasonable cost to (1) the qualifications of, and time spent by, the persons involved in conducting the audits, (2) the complexity of the building or industrial process being audited, (3) the amount of energy cost savings to be derived from implementing the audit's findings, and (4) the cost of implementing its recommendations.

FEA does not believe that sufficient information currently exists to develop a reasonable fee structure for persons having certain qualifications or to estimate the time required for individual audits. Therefore, in addition to its reluctance to prescribe guidelines that could be interpreted as a fee schedule, FEA has determined that basing reasonable cost determinations on the level of professional effort is not possible at the present time.

For a similar reason, i.e., the lack of adequate information regarding the costs and results of energy audits for buildings and industrial plants of varying types and complexity, it is not possible to relate reasonable costs to the characteristics of a building or industrial plant.

Finally, FEA does not support a criterion that would define reasonable cost in terms of the audit's findings regarding savings to be achieved or the cost of implementation of an energy measure. The use of this type of criterion would not be conducive to sound business practice because the cost of the auditor's services would be undetermined until after such services were provided.

Instead, the regulation specifies that the cost of the audit will be "reasonable" for purposes of the Act if it does not exceed 7 percent of the annual cost of energy used in the building or industrial plant to be modified. This determination is based on knowledge regarding a number of audits that have been conducted on various types of facilities, most of which cost less than 5 percent of the annual energy costs. However, because there are isolated instances in which the costs exceeded 5 percent and because the cases for which information is available cannot be held as representative of all possible energy audit applications, a figure of 7 percent is used. By holding 7 percent as an upper bound, the regulation encourages parties seeking an energy audit to use careful judgment in selecting the auditor, defining the scope of the audit, and negotiating the final cost with the auditor. By allowing for exceptions to this upper limit based on FEA's finding that the facility being audited exhibits unique or unusually complex characteristics, FEA recognizes the probability of isolated cases in which the conduct of a technically sound audit imposes costs greater than 7 percent of the annual energy costs.

FEA is particularly interested in receiving comments on the proposed ap-

proach to reasonable costs in § 450.14 and § 450.23.

VII. QUALIFICATIONS OF AUDITORS

The States are given considerable discretion in developing standards by which a person will be designated as qualified to conduct Class A information audits of various types of buildings and industrial plants, subject to the approval of FEA. The regulation does prescribe specific qualifications for a person who wishes to conduct a verification audit. Proposed § 450.22 requires that to be considered qualified to conduct a verification audit, a person must either (1) be licensed as a professional engineer or architect by the State in which the audit is performed, or (2) have an engineering degree from an accredited college or university plus four years of relevant experience.

Two other options were considered. On the one hand, FEA could have stipulated that only licensed professional engineers and architects are qualified to conduct verification audits. It was decided, however, that this would be too restrictive to be used in connection with Federal programs which are intended to accelerate the adoption of energy measures. Thus, it was decided to allow graduates of accredited engineering schools to conduct verification audits if they have experience relevant to the building or industrial plant being audited and are willing to certify to this effect in the report of an audit.

The other option considered was the establishment of procedures for FEA accreditation of persons authorized to conduct verification audits, combined with a Federal training program to assure a supply of such approved auditors.

This was considered inappropriate because it would require the Federal Government to expend resources establishing a potentially cumbersome accreditation program that would duplicate many of the professional accreditation procedures that currently exist at the State level; and, in the short term, would inhibit the conduct of verification audits because of the time required to design and implement such accreditation procedures.

FEA is particularly interested in receiving comments on whether the two classes of persons described in proposed § 450.22(a), or others, should be deemed qualified to conduct verification audits and on procedures which could be used to screen the qualifications of persons in any other classes.

VIII. CONFLICT OF INTEREST

With respect to Class A information audits, a State shall provide conflict of interest procedures as part of its supplemental plan, subject to FEA approval.

With respect to a verification audit, proposed § 450.22(c) requires the disclosure by an auditor of any significant financial interest held by the auditor and his or her spouse or children, in the manufacturing (including manufacturing of major components), marketing, installing or servicing of the modification, or in the ownership or operation of the building or industrial plant, that is the subject of the audit. The regulation also identifies the financial interests that FEA considers significant.

The regulation further requires that the disclosure be made in writing to the person for whom the verification audit is to be performed before the audit is begun. Furthermore, a copy of the disclosure statement is to accompany the submission of an audit report to the Federal Government, which may rely on its contents. Proposed § 450.22(e)(2) requires that the auditor certify in the audit report that the auditor has made a full written disclosure of significant financial interests to his client.

The disclosure statement will alert both the person for whom the audit is performed, and any Federal agency which may consider the audit report, to the possibility that an auditor's findings may be influenced by personal financial interests. However, FEA is proposing not to prohibit an auditor who has a significant financial interest from performing a verification audit.

Although such a prohibition would guarantee preparation of the audit by a disinterested auditor, there are certain countervailing considerations. One consideration is that this could limit the number of people qualified to perform audits. The persons most highly skilled and qualified may already be associated with financial interests in the field of energy conservation or with the management of the building or plant being audited. Any Federal energy conservation programs in connection with which audits are to be performed will be intended to accelerate the adoption of energy measures, and this prohibition could work to delay or deter businesses from implementing energy measures.

Another consideration is that business enterprises which are engaged in the manufacturing, marketing, installing or servicing of a particular energy measure might be willing to perform audits for a client at a reduced cost or at no cost. A financial interest prohibition might discourage some persons from applying to participate in a Federal program for fostering the implementation of energy measures because they may not be able or willing to pay for an audit when there is no certainty that their applications will be approved.

FEA also considered the question of whether to require disclosure of financial interests held by members of the auditor's family, and if so, which members. FEA has decided that it is desirable to hold an auditor responsible for disclosure of the financial interests of a spouse or child on the ground that it is highly probable their financial interests are known to the auditor and on the ground that, if the auditor does not know, the information needed to comply with this part can easily be obtained.

Another alternative that FEA considered was whether a financial interest in a business enterprise engaged in the manufacturing, marketing, installing or servicing of an energy measure other than the energy measure which is the subject of the audit should be required to be disclosed. This alternative was not adopted on the ground that there would most likely be no conflict of interest in that case.

FEA also considered the question of whether to exclude from the disclosure requirement a financial interest in a business enterprise in which less than a certain percentage of gross receipts is generated by sales or services related to the energy measure which is the subject of the audit. This alternative was not adopted because its application is not quantifiable. For example, a manufacturer entering into production of a new energy measure may have no gross receipts whatsoever with respect to sale of the energy measure.

However, the manufacturer's interest in promoting the sale of the energy measure may, at the very least, be considered to be significant.

FEA is particularly interested in receiving comments on whether otherwise qualified individuals having the types of financial interests described in proposed § 450.22(b), or others, should be prohibited from performing verification audits.

IX. CERTIFICATION IN VERIFICATION AUDIT REPORT

Proposed § 450.22(e) requires that the auditor, as part of a verification audit report, certify that he is qualified to perform the audit, has made a full disclosure of financial interest, has conducted the audit in accordance with the regulation, and has accurately described the findings in the report. In addition, the auditor must indicate an understanding that the report may be submitted to an agency of the Federal Government for official action. Any false representations or concealment of material facts in the areas certified to may subject the auditor to criminal prosecution under 18 U.S.C. Section 1001. Conviction under this criminal provision is punishable by a fine of not more than $10,000 or imprisonment for not more than five years, or both.

X. COMMENT PROCEDURE

A. WRITTEN COMMENT PROCEDURES

Interested persons are invited to participate in this rulemaking by submitting data, views, or arguments with respect to the proposed rules set forth in this notice to Executive Communications, Room 3309, Federal Energy Administration, Box LQ, Washington, D.C. 20461.

Comments should be identified on the outside of the envelope and on documents submitted to FEA Executive Communications with the designation "Proposed Energy Audit Regulation." Fifteen copies should be submitted. All comments received by May 13, 1977, before 4:30 p.m., e.d.t., and all other relevant information, will be considered by FEA before final action is taken regarding the proposed regulation.

Any information or data considered by the person furnishing it to be confi-

dential must be so identified and submitted in writing, one copy only. FEA reserves the right to determine the confidential status of the information or data and to treat it according to its determination.

B. PUBLIC HEARINGS

FEA has determined that in addition to holding a public hearing on this proposal in Washington, D.C., it will hold public hearings in Kansas City, Missouri and San Francisco, California. In addition, FEA will welcome oral presentation on this proposal at the public hearings it has scheduled in each of the 10 FEA regions on its proposed supplemental State energy conservation plan guidelines. The schedule for these hearings, which will occur between April 19, 1977 and April 23, 1977, was published along with the proposed guidelines in the FEDERAL REGISTER, 42 FR 16150, on March 25, 1977. However, written comments shall be sent to Box LQ at the address provided above and shall be identified with the designation "Proposed Energy Audit Regulation."

1. *National hearing.* The Washington, D.C., hearing (hereinafter referred to as the National hearing) will be held beginning at 9:30 a.m., e.d.t., May 10, 1977, at 2000 M Street, N.W., Room 2105, Washington, D.C. The hearing will be continued, if necessary, on May 11, 1977. Any person who has an interest in this proceeding or who is a representative of a group or class of persons that has an interest in this proceeding may make a written request for an opportunity to make an oral presentation. Such a request should be directed to Executive Communcations, FEA, Room 3309, Federal Building, 12th and Pennsylvania Avenue NW., Washington, D.C. 20461, and must be received before 4:30 p.m., e.d.t., on April 25, 1977. A request may be hand-delivered between the hours of 8 a.m., and 4:30 p.m., Monday through Friday. Requests should be submitted in accordance with the "Request Procedures" set forth below.

2. *Regional hearings.* Both of the regional hearings will be held beginning at 9:30 a.m., local time, on the dates and at the locations specified below.

Any person who has an interest in this proceeding or who is a representative of a group or class of persons that has an interest may make a written request for an opportunity to make an oral presentation. Such a request should be directed to FEA at the address given below for the appropriate region, and in accordance with the "Request Procedures" set forth below. Requests must be received before 4:30 p.m., local time, on April 27, 1977.

City	Hearing date	Submit requests to testify to—	Hearing location
Kansas City, Mo.....	May 12	FEA, 1150 Grand Ave., Kansas City, Mo. 64106.	Room 140, Federal Bldg., 601 East 12th St., Kansas City, Mo.
San Francisco, Calif...	May 13	FEA, 111 Pine St., 4th floor, San Francisco, Calif. 94111.	EPA conference rooms A and B, 2d floor 100 California St., San Francisco, Calif.

3. *Request procedure.* The following request procedures are applicable to both the National and regional hearings. Persons requesting an opportunity to make an oral presentation will submit their written requests to the appropriate address for the region in which they wish to appear. Requests should be labelled both on the document and on the envelope "Energy Audit Hearing."

The person making the request should briefly describe the interest concerned; if appropriate, state why she or he is a proper representative of a group or class of persons that has such an interest; and give a concise summary of the proposed oral presentation and a phone number where she or he may be contacted through May 11, 1977, for regional hearings and May 9, 1977, for the National hearing. Each person selected to be heard will be notified by FEA before 4:30 p.m., local time, May 9, 1977, in the case of the regional hearings and by May 6, 1977, in the case of the National hearing. Each person selected to be heard must submit 100 copies, if feasible, of her or his statement to the Office of Regulation Development, FEA, Room 2214, 2000 M Street NW., Washington, D.C., before 9 a.m., e.d.t., May 10, 1977, for the National hearing and to the location of the hearing by 9 a.m., on the day the statement is scheduled to be presented, for regional hearings.

4. *Hearing procedures.* FEA reserves the right to select the persons to be heard at these hearings, to schedule their respective presentations and to establish the procedures governing the conduct of the hearings. The length of each presentation may be limited, based on the number of persons requesting to be heard.

An FEA official will be designated to preside at the hearings. These will not be judicial or evidentiary-type hearings. Questions may be asked only by those conducting the hearings. At the conclusion of all initial oral statements, each person who has made an oral statement will be given the opportunity, if she or he desires, to make a supplemental statement which will be given in the order in which the initial statements were made and will be subject to time limitations.

Any person attending the hearing who wishes to ask a question at the hearings may submit the question, in writing, to the presiding officer. The presiding officer will determine whether the question is relevant, and whether the time limitations permit it to be presented for answer.

Any further procedural rules needed for the proper conduct of the hearings will be announced by the presiding officer.

A transcript of the hearings will be made and the entire record of the hearings, including the transcript, will be retained by FEA and made available for inspection at the Freedom of Information Office, Room 2107, Federal Building, 12th and Pennsylvania Avenue NW., Washington, D.C., between the hours of 8 a.m., and 4:30 p.m., Monday through Friday. Any person may purchase a copy of the transcript from the reporter.

XI. COORDINATION WITH OUTSIDE PARTIES, ENVIRONMENTAL AND INFLATIONARY REVIEW

In preparing this proposed rulemaking, issues and options were reviewed not only internally within FEA but also by representatives from the Energy Research and Development Administration, representatives of the Department of Housing and Urban Development, and representatives of the Department of Commerce, including the National Bureau of Standards.

In accordance with FEA's obligations under the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 et seq.), an evaluation of the potential environmental impacts of designating rules for the conduct of energy audits has been prepared by FEA. No "significant" environmental impacts have been identified as defined by NEPA.

As required by Section 7(c)(2) of the Federal Energy Administration Act of 1974, Pub. L. 93-275, a copy of this notice has been submitted to the Administrator of the Environmental Protection Agency (EPA) for his comments concerning the impact of this proposal on the quality of the environment. The Administrator has no comments.

NOTE.—The proposal has been reviewed in accordance with Executive Order 11821, and OMB Circular Number A-107, issued November 27, 1974, and has been determined not to be a major proposal requiring an evaluation of its inflationary impact.

In consideration of the foregoing, it is proposed to add a new Part 450 to Chapter II of Title 10, Code of Federal Regulations, as set forth below.

Issued in Washington, D.C., April 8, 1977.

ERIC J. FYGI,
Acting General Counsel,
Federal Energy Administration.

Subchapter D. Chapter II of Title 10, Code of Federal Regulations, is amended by establishing Part 450 as follows:

PART 450—ENERGY AUDITS

Subpart A—General Provisions

Sec.

450.1 Purpose and scope.
450.2 Uses of energy audits.
450.3 Definitions.
450.4 Qualifying conditions.

Subpart B—Information Audits

450.10 Purpose and scope.
450.11 Classes of and requirements for information audits.
450.12 Contents of information audits.
450.13 Auditors.
450.14 Cost of information audits.

Subpart C—Verification Audits

Sec.
450.20 Purpose and scope.
450.21 Contents of verification audits.
450.22 Auditors.
450.23 Cost of verification audits.

AUTHORITY: Energy Conservation and Production Act, Pub. L. 94-385; Energy Policy and Conservation Act, Pub. L. 94-163; Federal Energy Administration Act of 1974; as amended, Pub. L. 93-275 and Pub. L. 94-385; E.O. 11790, 39 FR 23185.

Subpart A—General Provisions

§ 450.1 Purpose and scope.

This part designates the types of, and requirements for, energy audits as required by the Federal Energy Administration, pursuant to Section 432(d) of the Energy Conservation and Production Act, Pub. L. 94-385, 90 Stat. 1125 et seq., which adds Section 365(e)(2), 42 U.S.C. 6325(e)(2), to the Energy Policy and Conservation Act, 42 U.S.C. 6201 et seq. This part also contains the projections of future energy prices which shall be used in calculating the changes in energy costs which will result from installation of a particular modification in a building or industrial plant, and includes the criteria for determining whether the installation of a particular modification meets certain requirements of the Act for designation as an energy measure.

§ 450.2 Uses of energy audits.

The requirements of this part shall be used—

(a) To establish minimum requirements for the type of energy audit to be carried out under a supplemental plan;

(b) To measure the energy and cost savings to be derived from the installation or implementation of an energy measure; and

(c) To provide a process to identify a modification of a designated building or industrial plant as an energy measure for purposes of the Act.

§ 450.3 Definitions.

As used in this part—

"Administrator" means the Administrator of the Federal Energy Administration.

"Appliance" means an energy consuming article or device designed for household use the primary purpose of which is labor saving or personal convenience and which, although connected to public utilities servicing the building, is not attached to a building such that it would be considered part of the building or building system; for example, room air conditioners, room heat pumps, room heaters, refrigerators, refrigerator-freezers, clothes washers and dryers, dish-washers, kitchen ranges and ovens, and television sets. Energy consuming articles or devices not classified as an appliance and considered part of a building or building system include, but are not limited to water heaters, central heat pumps, central air conditioners, and central heating units.

"Approved" means, with respect to an energy measure, any modification which is included on a list of energy measures published by FEA pursuant to section 365(e)(1), 42 U.S.C. 6325(e)(1), of the Energy Policy and Conservation Act.

"Attributed Life" means, with respect to an energy conservation measure, the time period which is equal to either the useful life or 15 years, whichever is less or, with respect to a renewable-resource energy measure, the time period which is equal to either the useful life or 25 years, whichever is less.

"Auditor" means any person or persons who conduct an energy audit which is represented to be in conformance with this regulation.

"British Thermal Unit" means the amount of heat required to raise the temperature of one pound of water one degree Fahrenheit.

"Btu" means British thermal unit or units.

"Building" means any structure which includes a heating or cooling system, or both, or a hot water system, and which was constructed prior to August 14, 1976.

"Building Envelope" means all external surfaces, such as walls, doors and windows, roof, and floors in contact with the ground, of a building which are affected by weather.

"Depletable Energy Resource" means a fossil fuel or nuclear fission fuel.

"Distillate Fuel Oil" means any fuel oil, gas oil, topped crude oil, or other petroleum oils, except refined petroleum wax, derived by refining or processing crude oil or unfinished oils, in whatever type of plant such refining or processing may occur, which have a boiling range at atmospheric pressure which falls completely or in part between 550° and 1,200° F.

"Dual-Purpose Power Plant" means an equipment configuration which produces both electricity and useful thermal energy and which consumes, exclusive of the fuel required to produce the useful thermal energy, less than 7,500 Btu of fuel per kilowatt-hour of electricity produced.

"Dwelling Unit" means a house, including a stationary mobile home, an apartment, a group of rooms, or a single room occupied as separate living quarters.

"Energy Audit" means a process which identifies and specifies the energy and cost savings which are likely to be realized through the purchase and installation of particular energy conservation measures or renewable-resource energy measures and which is carried out in accordance with this part.

"Energy Conservation Measure" means a measure which modifies any building or industrial plant, the construction of which has been completed prior to August 14, 1976, if such measure has been determined by means of an energy audit or by FEA, by rule, to be likely to improve the efficiency of energy use and to reduce energy costs in an amount not less than the total cost of purchasing and installing such measure (without regard to any tax benefit or Federal financial assistance applicable thereto), within the period of—

(1) The useful life of the modification involved; or

(2) Fifteen years after the purchase and installation of such measure, whichever is less.

Such terms does not include the purchase or installation of any appliance, any conversion from one fuel or source of energy to another which FEA, by rule, determines is ineligible on the basis that such type of conversion is inconsistent with national policy with respect to energy conservation or reduction of imports of fuels, or any measure or type of measure which does not have as its primary purpose an improvement in efficiency of energy use.

"Energy Measure" means an energy conservation measure or renewable-resource energy measure.

"Industrial Plant" means any fixed equipment or facility which is used in connection with, or as part of, a process or system for industrial production or output and which was constructed prior to August 14, 1976.

"Industrial Process" means an action or series of actions in connection with, or part of, a process or system contributing to the production or output of an industrial plant.

"Liquefied Petroleum Gas" means propane and butane, and propane/butane mixes but not ethane.

"LPG" means liquefied petroleum gas.

"Modification" means a measure which changes a building or industrial plant, the construction of which was completed prior to August 14, 1976.

"Nondepletable Energy Resource" means a type of energy other than a depletable energy resource.

"Renewable-Resource Energy Measure" means a measure which modifies any building or industrial plant, the construction of which has been completed prior to August 14, 1976, if such measure has been determined by means of an energy audit or by FEA, by rule, to—

(1) Involve changing in whole or in part, the fuel or source of the energy used to meet the requirements of such building or plant from a depletable source of energy to a nondepletable source of energy; and

(2) Be likely to reduce energy costs in an amount not less than the total cost of purchasing and installing such measure (without regard to any tax benefit or Federal financial assistance applicable thereto), within the period of—

(i) The useful life of the modification involved, or

(ii) Twenty-five years after purchase and installation of such measure, whichever is less. Such term does not include the purchase or installation of any appliance.

"Residual Fuel" means No. 4 fuel oil, No. 4-D fuel oil, those fuel oils commonly known as American Society for Testing Materials No. 5 and No. 6 fuel oils, heavy diesel, Navy diesel, Bunker C and all other fuel oils which have a fifty percent boiling point over 700° F in the American Society for Testing Materials D-86 standard distillation test.

"Supplemental Plan" means a supplemental State energy conservation plan which is eligible for financial assistance

under Part 420, Subchapter D, Chapter II of Title 10, Code of Federal Regulations.

"Useful Life" means that period of time for which a modification used under specified conditions is able to fulfill its intended function, and which does not exceed the period of remaining use of the building or that element of the industrial plant, which is being modified.

§ 450.4 Qualifying conditions.

(a) A modification has as its primary purpose an improvement in energy use efficiency only if the costs of the purchase and installation of the modification will be recovered by the projected energy cost savings associated with improving the efficiency of energy use over the attributed life of the modification.

(b) A modification is determined to result in an ineligible conversion if its implementation would result in an increase, expressed in Btu, at the building or industrial plant site, in the consumption of petroleum products, natural gas, or a combination of the two.

(c) An increase in the consumption of petroleum products at a building or industrial plant site shall not be an ineligible conversion as provided by paragraph (b) of this section, if the increase will result from the installation of dual-purpose power plant equipment which FEA determines in a specific application produces an off-setting reduction in the consumption of petroleum products, natural gas, or a combination of them, at one or more sites.

(d) Projected prices for electricity, natural gas, distillate, residual fuel, LPG and coal shall be derived from either—

(1) The projected energy prices from 1977 to 1991 set forth in Appendix A, Tables 1–20 of this Part; or

(2) The following adjustment formulas—

(i) For petroleum products, coal, and natural gas:

$PA_t = PR_t - ((t-b)\cdot(PR_b - PA_b)/(1985-b))$, for $t<1985$.

$PA_t = PR_t$, for $t \geq 1985$.

Where—

PA_t = Projected fuel price for future year t.
PA_b = Fuel price actually paid in base year b.
PR_b = Regional fuel price for base year as set forth in Appendix A.
PR_t = Projected regional fuel price for future year t as set forth in Appendix A.
t = Future year for which fuel price is being projected.
b = Base year used in current FEA projection of fuel prices, as shown in Appendix A.

(ii) For electricity:

$PA_t = PR_t \cdot PA_b/PR_b$, for all years.

Where PA_t, PA_b, PR_b and PR_t have the same meaning as in subparagraph (d)(2)(i) of this section.

(e) Prices set forth in Appendix A, Tables 1–10 of this Part, expressed in dollars per physical unit, shall be converted to prices set forth in Appendix A, Tables 11–20, expressed in dollars per million Btu, by using the following conversion factors—

(1) Electricity—3412 Btu per kilowatt-hour.
(2) Natural Gas—1030 Btu per cubic foot.
(3) Distillate—5.825 million Btu per barrel.

FUEL OIL

(4) Residual Fuel—6.287 million Btu per barrel.
(5) Coal—22.5 million Btu per standard short ton.
(6) LPG—4.01 million Btu per barrel.

Subpart B—Information Audits

§ 450.10 Purpose and scope.

This subpart establishes the classes of and requirements for the conduct of information audits, the qualifications of persons conducting Class A information audits, and the allowable cost of information audits. Information audits are required to be provided for in supplemental State energy conservation plans pursuant to Part 420, Subpart D, Chapter II of Title 10, Code of Federal Regulations.

§ 450.11 Classes of and requirements for information audits.

(a) A Class A information audit shall consist of—

(1) An on-site visit at the building or industrial plant by an auditor who has qualifications considered appropriate by the State; and

(2) An evaluation by an auditor, supported by data, of the building or industrial plant's energy consumption and energy systems based on data such as heating and cooling degree days, fuel costs and other data considered appropriate by the State, which evaluation shall consist of either—

(i) An analysis of the energy and cost savings likely to result from the implementation of one or more modifications selected by the State, or

(ii) General recommendations regarding one or more modifications selected by the State accompanied by a workbook, manual, or other material allowing the owner, operator, or occupant of the building or industrial plant to calculate the energy and cost savings for those modifications.

(b) A Class B information audit shall consist of—

(1) Information provided by the owner, operator, or occupant of the building or industrial plant to the State, using a questionnaire provided by the State; and

(2) An evaluation whereby the information provided pursuant to paragraph (b)(1) of this section is analyzed by the State in such a way as to identify the energy and cost savings likely to result from not less than two modifications selected by the State, taking into account factors such as heating and cooling degree days, fuel costs and others considered appropriate by the State, and whereby the analysis is sent to the owner, operator or occupant of the building or industrial plant.

(c) A Class C information audit shall consist of—

(1) Using a workbook provided by the State, a calculation by the owner, operator, or occupant of the building or industrial plant of the energy and cost savings for each of not less than four modifications selected by the State, which calculations shall take into account factors such as heating and cooling degree days, fuel costs, and others considered appropriate by the State; and

(2) Any provision by the State of information relating to the building type or industrial plant, in the form of pamphlets, books, brochures or similar data regarding modifications which may prove to be energy conservation measures and renewable-resource energy measures.

§ 450.12 Contents of information audits.

(a) All three classes of information audits shall include an energy consumption description containing the following information—

(1) For a building—

(i) Actual energy consumption by type of fuel by month for the preceding 12 months, except that where actual energy consumption data are not available, estimates of actual energy consumption and an explanation of the derivation of the estimates;

(ii) Cost of energy by type of fuel for the preceding 12 months;

(iii) Building profile, including descriptions of—

(A) Location, climatic context, and immediate site conditions;

(B) Configuration, envelope, construction, and condition; and

(C) Heating, ventilating, air conditioning, hot water and lighting systems; and

(2) For an industrial plant—

(i) Actual energy consumption for both the plant's building operations and its industrial processes, by type of fuel by month for the preceding 12 months, except that where actual energy consumption data are not available, estimates of actual energy consumption and an explanation of the derivation of the estimates;

(ii) Cost of energy by type of fuel for the preceding 12 months;

(iii) Description of the plant's building characteristics, providing the information required by subparagraph (a)(1)(iii) of this section;

(iv) Profile of the plant's industrial processes, including a description of—

(A) The process layout and conditions within which it operates;

(B) Material storage, handling and processing; and

(C) All mechanical, electrical, hydraulic, and pneumatic systems, including those for waste handling; and

(v) Energy consumption of each process system by type of fuel.

(b) Each information audit shall identify and describe a modification sufficiently to enable the determination of the effects of the modification or combination of modifications on a building or industrial plant's energy consumption.

(c) Each information audit (1) shall identify and describe, by the procedures set forth in § 450.21 or other appropriate procedures, the total costs of purchasing and installing a modification, and the related energy and cost savings, as pre-

scribed by a State, subject to approval by FEA in the review of a State's supplemental plan and (2) shall indicate whether projected energy cost savings attributable to the modification are sufficient to recover the total cost of purchasing and installing the modification within its attributed life.

§ 450.13 Auditors.

The State shall establish the qualifications of those persons conducting Class A information audits, appropriate requirements and procedures to ensure that full disclosure of financial interests relating to each audit is made, and appropriate measures for certification by the auditor to assure that each audit has been conducted in accordance with this regulation. These provisions shall be subject to approval by FEA and made part of the supplemental plan submitted to FEA.

§ 450.14 Cost of information audits.

An information audit conducted under a supplemental plan shall—

(a) For an individual dwelling unit, be conducted at no direct cost to the occupants of that dwelling unit; and

(b) For any building or industrial plant not covered in paragraph (a) of this section, be conducted for a cost not to exceed 7 percent of the total cost of all energy used in the building or industrial plant during the 12 months preceding the audit, except that, subject to FEA review and approval, the State may establish procedures to permit information audit costs to exceed this limitation in those cases where the State finds that the buildings or industrial plants exhibit unique or unusually complex characteristics relating to energy use.

Subpart C—Verification Audits

§ 450.20 Purpose and scope.

This subpart prescribes guidelines for building and industrial process verification audits, which audits provide for a detailed analysis of the changes in energy use and costs likely to result from the implementation of a modification.

§ 450.21 Contents of verification audits.

(a) A verification audit shall contain an analysis of the actual or estimated energy consumption of the one or more building systems or industrial processes to be affected by the installation of a modification. The actual energy consumption of the building or industrial process shall be computed by type of fuel by month for a consecutive twelve-month period, if available. Information in a verification audit shall include, but not be limited to—

(1) Location, orientation, climatic context, and immediate site conditions;

(2) Operating characteristics, which shall include—

(i) For a building, a description of the building envelope, configuration, construction and condition, and daily hours of use; and

(ii) For an industrial process, a description of the plant, process and system layout, and operating conditions; and

(3) Actual energy consumption of the building or industrial process, by type of fuel per month, for the representative year selected, except that where actual energy consumption data are not available, estimates of actual energy consumption and a detailed explanation of the derivation of the estimates.

(b) A verification audit shall identify and describe—

(1) The modification which is the subject of the audit, including but not limited to—(i) The model and manufacturer; (ii) method of application for a building or industrial process; (iii) performance specifications which may include engineering drawings; (iv) useful life; (v) and for a modification under consideration as a renewable-resource energy measure, a description of the process by which the modification will convert one or more nondepletable energy resources to useful energy;

(2) All other modifications that are anticipated to be implemented by an owner, operator or occupant of the building or industrial plant that could influence the energy and cost savings associated with the modification for which the audit is being conducted;

(3) All alternative modifications considered in choosing to implement those identified in paragraphs (b) (1) and (b) (2) of this section;

(4) Future energy consumption for each year of the attributed life of the modification, by type of fuel, in terms of both units of fuel, such as kilowatt-hours of electricity or gallons of distillate fuel oil, and equivalent Btu, using the conversion factors pursuant to § 450.4 (e) under each of the following conditions—

(i) Without implementation of the modification identified in paragraph (b) (1) of this section, but including implementation of all of the modifications identified in paragraph (b) (2) of this section, if any, and

(ii) With implementation both of the modification identified in paragraph (b) (1) of this section and of all of the modifications identified in paragraph (b) (2) of this section, if any;

(5) For a modification under consideration as an energy conservation measure, the energy efficiency index shall be computed—

(i) For a building, by dividing the size of the building, expressed in terms of net square feet, by the number of Btu used in its operation; and

(ii) For an industrial process, by dividing the amount of production, consistently expressed in units, weight or volume, achieved by the industrial process being modified, by the number of Btu used in its operation;

(6) For a modification under consideration as an energy conservation measure, whether the energy efficiency index associated with the conditions prescribed in paragraph (b) (4) (ii) of this section is greater than the energy efficiency index associated with the conditions prescribed in paragraph (b) (4) (i) of this section, in which event the modification will be found to result in an improvement in the efficiency of energy use; and

(7) For a modification under consideration as a renewable-resource energy measure, whether the description of the modification establishes that nondepletable energy resources are converted to useful energy and if the number of Btu of depletable energy resources consumed under the conditions prescribed in paragraph (b) (4) (ii) of this section is less than the number of Btu of depletable energy resources consumed under the conditions prescribed in paragraph (b) (4) (i) of this section, in which event the modification will be found to result in a change from a depletable to a nondepletable energy resource.

(c) Costs and savings shall be presented in terms of constant dollars using the same base year as in the most current FEA projection of fuel prices set forth in Appendix A, Tables 1–20 of this Part. Future costs and savings shall be converted to present values using a discounting rate of 10 percent. Appendix B of this Part contains factors to be used in calculating the present value of future costs and savings at the 10 percent annual rate. Future costs and savings values are converted to present value by multipling each value by the discount factor for the year in which incurred.

(d) (1) Purchase and installation costs shall include—

(i) The costs of purchasing and installing the modification, including yearly principal and interest payments on debt incurred, converted to present value using the factors set forth in Appendix B of this Part, less any salvage value of existing equipment; and

(ii) Future purchase and installation costs for normal replacement of significant components and parts, less the cost of normal replacement of significant components and parts for existing equipment and less the cost which would be incurred for future replacement of existing equipment, calculated by year for the attributed life of the modification, which yearly costs shall be converted to present values by using the factors set forth in Appendix B of this Part.

(2) Energy cost savings shall be computed as follows—

(i) Fuel prices by type of fuel shall be derived for each year of attributed life of the modification using projected energy prices in accordance with § 450.4(d).

(ii) Future energy consumption, determined pursuant to paragraphs (b) (4) (i) and (ii) of this section, shall be multiplied by the fuel prices determined pursuant to paragraph (d) (2) (i) of this section to compute annual fuel costs with and without implementation of the modification. Reductions in fuel costs resulting from the installation of the modification shall be calculated by subtracting the annual fuel costs computed on the basis of the energey consumption determined pursuant to paragraph (b) (4) (ii) from those computed on the basis of paragraph (b) (4) (i), assuming no change in building size or production level. Values for each year of attributed

life shall be converted to present value using the factors set forth in Appendix B of this Part.

(3) The net present value of implementing the modification shall be computed by subtracting implementation costs and the present value of replacement costs calculated in accordance with paragraph (d)(1) of this section from present value of energy cost savings calculated in accordance with paragraph (d)(2) of this section.

(e) A verification audit shall contain a finding that a modification will reduce energy costs sufficiently to recover purchase and installation costs within the attributed life of the modification if the net present value is either zero or a positive value.

(f) The contents of a verification audit shall be reduced to writing in the form of an audit report which shall contain the information and supporting documentation required by this section.

§ 450.22 Auditors.

(a) A person who conducts a building verification audit shall—

(1) Be a licensed professional engineer or architect, or

(2) Have an engineering degree from an accredited college or university in addition to four years of subsequent experience in one or more of the following—

(i) Heating, ventilation and air conditioning installation or design work;

(ii) Building operations, including operation of the environmental systems; or

(iii) design of the building systems which are to be modified.

(d) A person who conducts an industrial process verification audit shall—

(1) Be a licensed professional engineer, or

(2) Have an engineering degree from an accredited college or university in addition to four years of subsequent experience in the design or operation of the particular industrial process being audited.

(c) Prior to conducting a verification audit, the auditor shall disclose in writing to the person for whom the audit is to be performed any significant financial interest held by the auditor, the auditor's spouse, or any child of the auditor, in a partnership, corporation, sole proprietorship, or other business enterprise engaged in the manufacturing, including manufacturing of major components, marketing, installing or servicing, of the modification which is the subject of an audit, or in the ownership or operation of the building or industrial plant which is the subject of an audit. A copy of the disclosure statement shall be signed by the auditor and shall accompany submission of the energy audit report or any portion thereof to FEA or any other agency, department or other instrumentality of the Federal Government.

(d) A financial interest shall be significant for the purposes of this section if it is one of the following—

(1) Employment, including employment as a consultant, by a partnership, corporation, sole proprietorship, or other business enterprise engaged in the manufacturing, marketing, installing or servicing of the modification which is the subject of an audit or in the ownership or operation of the building or industrial plant which is the subject of an audit;

(2) Ownership of 10 or more percent of the stock, including options to purchase stock, or other securities issued by a corporation, or of 10 o. more percent financial interest in any other business enterprise engaged in the manufacturing, marketing, installing or servicing of a modification which is the subject of an audit or in the ownership or operation of the building or industrial plant which is the subject of an audit;

(3) A position as a director or officer of a corporation or partner in a partnership or active principal in a consortium or any other business enterprise engaged in the manufacturing, marketing, installing or servicing of a modification which is the subject of an audit or in the ownership or operation of the building or industrial plant which is the subject of an audit;

(4) Participation in the profit-sharing program of a partnership, corporation, or other business enterprise engaged in the manufacturing, marketing, installing or servicing of a modification which is the subject of an audit or in the ownership or operation of the building or industrial plant which is the subject of an audit; or

(5) Ownership of patent rights or other industrial property interests or the receipt of royalties therefrom for the manufacturing, installing, or servicing of a modification which is the subject of an audit.

(e) Each verification audit report shall include a statement signed by the auditor certifying that—

(1) The auditor meets the qualifications set forth in paragraphs (a) and (b) of this section;

(2) The auditor has made a full written disclosure of any significant financial interests in accordance with paragraph (c) of this section;

(3) The audit was conducted in accordance with the requirements of Subpart C of this part;

(4) The audit report required by § 450.21(e) and accompanying documentation accurately describe the audit findings; and

(5) The auditor understands that the report will be submitted to a department or agency of the United States which may rely on the contents of the material prepared by the auditor.

§ 450.23 Cost of verification audits.

(a) A verification audit shall be conducted without cost to the occupant of a dwelling unit.

(b) The cost of a verification audit for a building or industrial plant not covered in paragraph (a) of this section shall not exceed 7 percent of the cost of all energy consumed in that building or industrial plant in the 12 months preceding the audit. FEA may grant an exception to this limitation when requested if it determines upon specific review of a proposed audit that the audited building or plant exhibits unique or unusually complex characteristics relating to energy use and that the audit will therefore be unusually costly to perform.

APPENDIX A—ENERGY PRICE PROJECTIONS

Tables 1–20 present FEA energy price projections in constant 1977 (Base Year) dollars for the years 1975 to 1991. The prices were developed from the most current Reference Case results of the Project Independence Evaluation System (PIES). These prices will be revised and reissued periodically. Abbreviations and other information pertinent to use of the tables are as follows:

1. Tables 1–10 show energy prices by fuel unit.

2. Tables 11–20 show energy prices per million Btu.

3. For the years following 1991, use 1991 prices.

4. FEA regions are comprised of the following:

Region I—New England: Maine, New Hampshire, Vermont, Rhode Island, Connecticut, Massachusetts.

Region II—New York/New Jersey: New York, New Jersey, Puerto Rico[1] Virgin Islands.[1]

Region III—Mid-Atlantic: Pennsylvania, Delaware, Maryland, Virginia, West Virginia, District of Columbia.

Region IV—South Atlantic: North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Canal Zone.[1]

Region V—Midwest: Michigan, Ohio, Indiana, Wisconsin, Minnesota, Illinois.

Region VI—Southwest: Arkansas, Louisiana, Oklahoma, Texas, New Mexico.

Region VII—Central: Iowa, Missouri, Nebraska, Kansas.

Region VIII—North Central: North Dakota, South Dakota, Montana, Wyoming, Colorado, Utah.

Region IX—Western: Nevada, Arizona, California, Hawaii, American Samoa,[1] Guam,[1] Trust Territory of the Pacific Islands.[1]

Region X—Northwestern: Idaho, Washington, Oregon, Alaska.

5. Column heading abbreviations mean as follows:

Res.—Residential Customer.
Comm.—Commercial Customer.
Ind.—Industrial Customer.
Elect.—Electricity.
N. Gas—Natural Gas.
Dist.—Distillate Fuel Oil.
Resid.—Residual Fuel Oil.
L.P.G.—Liquefied Petroleum Gas.
$/MKWH—Dollars per thousand kilowatthours.
$/MCFT—Dollars per thousand cubic feet.
$/BBL—Dollars per barrel.
$/MEST—Dollars per standard short ton (22.5 million Btu per ton).

[1] Price projections not yet available. Until such time as they are made available, regional prices shall be applicable.

TABLE 1
ENERGY PRICES IN 1977 DOLLARS PER FUEL UNIT
FEA REGION I NEW ENGLAND
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT. $/MKWH	COMM. ELECT. $/MKWH	IND. ELECT. $/MKWH	RES. N. GAS $/MCFT	COMM. N. GAS $/MCFT	IND. N. GAS $/MCFT	RES. DIST. $/BBL	COMM. DIST. $/BBL	IND. DIST. $/BBL	COMM. RESID. $/BBL	IND. RESID. $/BBL	RES. LPG $/BBL	IND. LPG $/BBL	IND. COAL $/MEST
1975	49.58	48.27	35.32	3.47	2.88	2.44	20.06	17.75	17.75	14.66	14.73	15.61	13.32	28.46
1976	49.60	48.39	36.00	3.47	2.87	2.77	20.23	18.12	18.11	15.37	15.49	15.31	13.29	30.74
1977	49.62	48.51	36.68	3.47	2.86	3.10	20.40	18.49	18.48	16.07	16.24	15.02	13.27	33.02
1978	49.64	48.64	37.36	3.47	2.85	3.44	20.58	18.85	18.85	16.77	17.00	14.72	13.24	35.29
1979	49.67	48.76	38.04	3.47	2.84	3.77	20.75	19.22	19.21	17.48	17.76	14.42	13.22	37.57
1980	49.69	48.88	38.72	3.48	2.83	4.10	20.92	19.59	19.58	18.18	18.51	14.12	13.19	39.85
1981	49.55	48.84	39.28	3.64	2.99	3.90	21.05	19.72	19.71	18.21	18.54	14.32	13.40	40.19
1982	49.41	48.80	39.84	3.80	3.15	3.69	21.17	19.84	19.83	18.23	18.56	14.52	13.61	40.54
1983	49.26	48.77	40.40	3.96	3.31	3.49	21.30	19.97	19.96	18.26	18.59	14.72	13.82	40.89
1984	49.12	48.73	40.96	4.12	3.47	3.28	21.42	20.09	20.08	18.28	18.61	14.93	14.04	41.23
1985	48.98	48.69	41.51	4.28	3.63	3.08	21.55	20.22	20.21	18.30	18.63	15.13	14.25	41.58
1986	49.34	49.14	42.57	4.46	3.81	3.26	21.82	20.49	20.48	18.42	18.75	15.39	14.51	41.83
1987	49.69	49.59	43.62	4.64	3.99	3.44	22.09	20.76	20.75	18.55	18.88	15.66	14.78	42.07
1988	50.05	50.05	44.67	4.82	4.17	3.62	22.36	21.03	21.02	18.67	19.00	15.92	15.04	42.32
1989	50.40	50.50	45.72	5.00	4.35	3.80	22.63	21.30	21.29	18.79	19.12	16.19	15.31	42.57
1990	50.75	50.95	46.77	5.18	4.53	3.98	22.90	21.57	21.56	18.91	19.24	16.45	15.57	42.82
1991	50.75	50.95	46.77	5.18	4.53	3.98	22.90	21.57	21.56	18.91	19.24	16.45	15.57	42.82

TABLE 2
ENERGY PRICES IN 1977 DOLLARS PER FUEL UNIT
FEA REGION II NEW YORK/NEW JERSEY
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT. $/MKWH	COMM. ELECT. $/MKWH	IND. ELECT. $/MKWH	RES. N. GAS $/MCFT	COMM. N. GAS $/MCFT	IND. N. GAS $/MCFT	RES. DIST. $/BBL	COMM. DIST. $/BBL	IND. DIST. $/BBL	COMM. RESID. $/BBL	IND. RESID. $/BBL	RES. LPG $/BBL	IND. LPG $/BBL	IND. COAL $/MEST
1975	55.70	56.00	30.33	2.83	2.30	1.71	18.26	16.60	16.53	14.32	14.32	12.92	11.65	23.76
1976	55.28	56.12	30.38	2.91	2.37	1.76	18.85	17.24	17.17	15.20	15.32	13.20	11.97	26.48
1977	54.87	56.25	30.43	2.98	2.43	1.81	19.44	17.89	17.81	16.09	16.33	13.47	12.30	29.20
1978	54.45	56.37	30.48	3.06	2.50	1.86	20.04	18.53	18.45	16.97	17.34	13.74	12.62	31.93
1979	54.04	56.49	30.54	3.14	2.56	1.91	20.63	19.18	19.08	17.86	18.34	14.02	12.95	34.65
1980	53.62	56.62	30.59	3.21	2.63	1.96	21.22	19.82	19.72	18.74	19.35	14.29	13.28	37.37
1981	53.09	56.63	30.56	3.32	2.74	2.07	21.37	19.97	19.87	18.77	19.37	14.52	13.52	37.72
1982	52.56	56.63	30.53	3.44	2.85	2.18	21.52	20.13	20.03	18.79	19.40	14.75	13.75	38.07
1983	52.03	56.64	30.51	3.55	2.97	2.29	21.67	20.28	20.18	18.82	19.42	14.98	13.99	38.41
1984	51.50	56.65	30.48	3.66	3.08	2.41	21.83	20.43	20.33	18.84	19.45	15.21	14.23	38.76
1985	50.97	56.66	30.45	3.77	3.19	2.52	21.98	20.58	20.48	18.86	19.47	15.44	14.47	39.10
1986	50.99	57.22	30.97	3.92	3.34	2.66	22.25	20.85	20.75	18.99	19.59	15.70	14.73	39.35
1987	51.01	57.78	31.50	4.06	3.48	2.81	22.52	21.12	21.02	19.11	19.71	15.97	15.00	39.60
1988	51.03	58.34	32.02	4.21	3.63	2.95	22.79	21.39	21.29	19.23	19.83	16.23	15.26	39.85
1989	51.04	58.90	32.54	4.35	3.77	3.10	23.06	21.66	21.56	19.35	19.95	16.50	15.53	40.09
1990	51.06	59.45	33.07	4.50	3.92	3.24	23.33	21.93	21.83	19.47	20.07	16.76	15.79	40.34
1991	51.06	59.45	33.07	4.50	3.92	3.24	23.33	21.93	21.83	19.47	20.07	16.76	15.79	40.34

PROPOSED RULES

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TABLE 3
ENERGY PRICES IN 1977 DOLLARS PER FUEL UNIT
FEA REGION III MID-ATLANTIC
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT. $/MKWH	COMM. ELECT. $/MKWH	IND. ELECT. $/MKWH	RES. N. GAS $/MCFT	COMM. N. GAS $/MCFT	IND. N. GAS $/MCFT	RES. DIST. $/BBL	COMM. DIST. $/BBL	IND. DIST. $/BBL	COMM. RESID. $/BBL	IND. RESID. $/BBL	RES. LPG $/BBL	IND. LPG $/BBL	IND. COAL $/MEST
1975	41.77	38.85	27.36	2.19	1.87	1.22	17.81	16.53	16.40	14.25	14.04	11.85	10.98	18.32
1976	41.60	38.78	27.69	2.30	1.96	1.36	18.70	17.24	17.25	15.51	15.25	12.40	11.59	21.63
1977	41.44	38.72	28.01	2.42	2.05	1.50	19.58	17.95	18.09	16.77	16.45	13.16	12.20	24.95
1978	41.27	38.65	28.34	2.53	2.13	1.63	20.47	18.66	18.93	18.03	17.66	13.92	12.81	28.26
1979	41.10	38.59	28.66	2.65	2.22	1.77	21.36	19.38	19.77	19.29	18.87	14.68	13.42	31.58
1980	40.93	38.52	28.98	2.76	2.31	1.90	22.24	20.09	20.61	20.55	20.07	15.44	14.03	34.90
1981	41.24	38.94	29.83	2.88	2.43	2.02	22.39	20.24	20.77	20.57	20.10	15.68	14.27	35.29
1982	41.56	39.37	30.67	2.99	2.54	2.14	22.55	20.39	20.92	20.60	20.12	15.91	14.50	35.69
1983	41.87	39.79	31.51	3.11	2.66	2.25	22.70	20.54	21.07	20.62	20.15	16.15	14.74	36.09
1984	42.18	40.21	32.36	3.23	2.78	2.37	22.85	20.69	21.22	20.64	20.17	16.39	14.98	36.48
1985	42.49	40.63	33.20	3.34	2.89	2.49	23.00	20.84	21.37	20.67	20.20	16.63	15.22	36.88
1986	42.76	41.01	33.99	3.46	3.01	2.60	23.27	21.12	21.64	20.79	20.32	16.89	15.48	37.08
1987	43.03	41.39	34.79	3.57	3.12	2.71	23.54	21.39	21.91	20.91	20.44	17.16	15.75	37.27
1988	43.30	41.77	35.59	3.69	3.24	2.83	23.81	21.66	22.18	21.03	20.56	17.42	16.01	37.47
1989	43.57	42.15	36.38	3.80	3.35	2.94	24.08	21.93	22.46	21.15	20.68	17.69	16.28	37.67
1990	43.83	42.53	37.18	3.92	3.46	3.06	24.35	22.20	22.73	21.27	20.80	17.95	16.54	37.87
1991	43.83	42.53	37.18	3.92	3.46	3.06	24.35	22.20	22.73	21.27	20.80	17.95	16.54	37.87

TABLE 4
ENERGY PRICES IN 1977 DOLLARS PER FUEL UNIT
FEA REGION IV SOUTH ATLANTIC
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT. $/MKWH	COMM. ELECT. $/MKWH	IND. ELECT. $/MKWH	RES. N. GAS $/MCFT	COMM. N. GAS $/MCFT	IND. N. GAS $/MCFT	RES. DIST. $/BBL	COMM. DIST. $/BBL	IND. DIST. $/BBL	COMM. RESID. $/BBL	IND. RESID. $/BBL	RES. LPG $/BBL	IND. LPG $/BBL	IND. COAL $/MBST
1975	30.74	32.20	19.82	1.69	1.34	0.94	17.94	16.53	16.40	12.72	12.86	10.98	10.15	21.78
1976	31.75	33.11	21.38	1.81	1.43	1.04	18.88	17.25	17.23	13.85	13.92	11.88	10.95	25.24
1977	32.76	34.02	22.95	1.93	1.52	1.14	19.82	17.96	18.07	14.97	14.97	12.78	11.75	28.71
1978	33.77	34.92	24.52	2.05	1.62	1.24	20.76	18.68	18.90	16.09	16.03	13.68	12.55	32.17
1979	34.73	35.83	26.09	2.18	1.71	1.34	21.70	19.39	19.73	17.21	17.08	14.58	13.36	35.64
1980	35.79	36.74	27.65	2.30	1.80	1.44	22.64	20.11	20.56	18.34	18.14	15.48	14.16	39.10
1981	35.84	36.68	28.28	2.43	1.93	1.59	22.80	20.27	20.72	18.37	18.17	15.74	14.42	39.50
1982	35.89	36.62	28.91	2.55	2.06	1.74	22.96	20.43	20.88	18.40	18.20	15.99	14.67	39.90
1983	35.93	36.56	29.53	2.68	2.19	1.89	23.12	20.59	21.04	18.44	18.24	16.25	14.93	40.29
1984	35.98	36.50	30.16	2.81	2.31	2.04	23.28	20.75	21.20	18.47	18.27	16.51	15.18	40.69
1985	36.02	36.44	30.79	2.94	2.44	2.19	23.44	20.91	21.36	18.50	18.30	16.76	15.44	41.08
1986	36.14	36.45	31.48	3.08	2.58	2.31	23.73	21.20	21.65	18.62	18.42	17.05	15.72	41.28
1987	36.25	36.46	32.17	3.21	2.72	2.43	24.03	21.50	21.95	18.74	18.55	17.34	16.00	41.48
1988	36.37	36.46	32.86	3.35	2.86	2.55	24.32	21.79	22.24	18.86	18.67	17.64	16.29	41.68
1989	36.48	36.47	33.55	3.49	3.00	2.67	24.61	22.08	22.53	18.99	18.79	17.93	16.57	41.88
1990	36.60	36.48	34.24	3.63	3.13	2.79	24.90	22.37	22.82	19.11	18.91	18.22	16.85	42.07
1991	36.60	36.48	34.24	3.63	3.13	2.79	24.90	22.37	22.82	19.11	18.91	18.22	16.85	42.07

TABLE 5
ENERGY PRICES IN 1977 DOLLARS PER FUEL UNIT
FEA REGION V MIDWEST
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT. $/MKWH	COMM. ELECT. $/MKWH	IND. ELECT. $/MKWH	RES. N. GAS $/MCFT	COMM. N. GAS $/MCFT	IND. N. GAS $/MCFT	RES. DIST. $/BBL	COMM. DIST. $/BBL	IND. DIST. $/BBL	COMM. RESID. $/BBL	IND. RESID. $/BBL	RES. LPG $/BBL	IND. LPG $/BBL	IND. COAL $/MEST
1975	36.37	35.58	21.99	1.73	1.46	1.21	16.92	15.95	15.95	15.35	15.28	10.41	9.79	21.78
1976	36.67	35.96	22.88	1.84	1.56	1.30	17.44	16.47	16.46	16.20	16.11	11.01	10.38	24.25
1977	36.98	36.33	23.77	1.95	1.66	1.38	17.97	16.98	16.97	17.04	16.94	11.61	10.97	26.73
1978	37.28	36.71	24.66	2.05	1.75	1.46	18.49	17.50	17.48	17.89	17.78	12.21	11.57	29.20
1979	37.59	37.09	25.55	2.16	1.85	1.54	19.02	18.01	17.99	18.73	18.61	12.81	12.16	31.68
1980	37.89	37.47	26.44	2.27	1.95	1.63	19.55	18.52	18.50	19.58	19.44	13.41	12.75	34.15
1981	38.20	37.84	27.36	2.38	2.06	1.74	19.82	18.80	18.78	19.61	19.47	13.67	13.02	34.45
1982	38.50	38.21	28.27	2.49	2.17	1.85	20.10	19.07	19.05	19.65	19.50	13.94	13.29	34.75
1983	38.81	38.59	29.18	2.60	2.28	1.96	20.37	19.35	19.33	19.68	19.54	14.20	13.57	35.05
1984	39.11	38.96	30.10	2.71	2.40	2.08	20.65	19.62	19.60	19.71	19.57	14.47	13.84	35.34
1985	39.41	39.34	31.01	2.83	2.51	2.19	20.92	19.90	19.88	19.74	19.60	14.73	14.12	35.64
1986	39.70	39.69	31.90	3.03	2.71	2.39	21.23	20.21	20.19	19.87	19.72	15.03	14.41	35.89
1987	39.98	40.04	32.80	3.23	2.91	2.59	21.54	20.52	20.50	19.99	19.84	15.33	14.70	36.13
1988	40.26	40.40	33.69	3.43	3.12	2.80	21.85	20.83	20.81	20.11	19.96	15.63	14.99	36.38
1989	40.55	40.75	34.58	3.64	3.32	3.00	22.16	21.14	21.12	20.23	20.09	15.93	15.28	36.63
1990	40.83	41.11	35.47	3.84	3.52	3.20	22.47	21.45	21.43	20.35	20.21	16.23	15.57	36.88
1991	40.83	41.11	35.47	3.84	3.52	3.20	22.47	21.45	21.43	20.35	20.21	16.23	15.57	36.88

TABLE 6
ENERGY PRICES IN 1977 DOLLARS PER FUEL UNIT
FEA REGION VI SOUTHWEST
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT. $/MKWH	COMM. ELECT. $/MKWH	IND. ELECT. $/MKWH	RES. N. GAS $/MCFT	COMM. N. GAS $/MCFT	IND. N. GAS $/MCFT	RES. DIST. $/BBL	COMM. DIST. $/BBL	IND. DIST. $/BBL	COMM. RESID. $/BBL	IND. RESID. $/BBL	RES. LPG $/BBL	IND. LPG $/BBL	IND. COAL $/MEST
1975	29.69	25.93	15.91	1.53	1.03	0.80	17.43	15.95	15.89	13.28	13.69	10.72	9.92	41.83
1976	33.13	29.56	20.00	1.60	1.10	1.03	18.12	16.66	16.58	14.33	14.65	11.33	10.52	39.75
1977	36.58	33.19	24.08	1.66	1.16	1.25	18.80	17.36	17.28	15.38	15.60	11.94	11.12	37.67
1978	40.02	36.81	28.16	1.73	1.22	1.47	19.49	18.06	17.97	16.43	16.56	12.54	11.72	35.59
1979	43.47	40.44	32.24	1.79	1.29	1.69	20.18	18.76	18.67	17.47	17.51	13.15	12.32	33.51
1980	46.91	44.07	36.32	1.86	1.35	1.91	20.87	19.46	19.36	18.52	18.47	13.76	12.92	31.43
1981	46.33	43.66	36.39	1.91	1.53	1.92	21.03	19.62	19.52	18.56	18.50	14.02	13.19	31.88
1982	45.74	43.26	36.45	1.96	1.70	1.92	21.19	19.78	19.68	18.59	18.53	14.27	13.45	32.32
1983	45.15	42.86	36.52	2.02	1.87	1.93	21.35	19.94	19.84	18.62	18.57	14.53	13.72	32.77
1984	44.57	42.46	36.59	2.07	2.05	1.93	21.51	20.10	20.00	18.66	18.60	14.79	13.98	33.21
1985	43.98	42.05	36.65	2.12	2.22	1.94	21.67	20.26	20.16	18.69	18.63	15.04	14.25	33.66
1986	44.47	42.72	37.79	2.27	2.46	2.18	21.96	20.55	20.46	18.81	18.75	15.34	14.54	34.11
1987	44.95	43.39	38.93	2.41	2.70	2.42	22.26	20.85	20.75	18.93	18.88	15.64	14.83	34.55
1988	45.44	44.06	40.07	2.56	2.94	2.66	22.55	21.14	21.04	19.05	19.00	15.94	15.12	35.00
1989	45.93	44.73	41.21	2.70	3.18	2.90	22.84	21.43	21.33	19.17	19.12	16.24	15.41	35.44
1990	46.42	45.40	42.35	2.85	3.42	3.13	23.13	21.72	21.63	19.29	19.24	16.54	15.70	35.89
1991	46.42	45.40	42.35	2.85	3.42	3.13	23.13	21.72	21.63	19.29	19.24	16.54	15.70	35.89

TABLE 7
ENERGY PRICES IN 1977 DOLLARS PER FUEL UNIT
FEA REGION VII CENTRAL
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT. $/MKWH	COMM. ELECT. $/MKWH	IND. ELECT. $/MKWH	RES. N. GAS $/MCFT	COMM. N. GAS $/MCFT	IND. N. GAS $/MCFT	RES. DIST. $/BBL	COMM. DIST. $/BBL	IND. DIST. $/BBL	COMM. RESID. $/BBL	IND. RESID. $/BBL	RES. LPG $/BBL	IND. LPG $/BBL	IND. COAL $/MEST
1975	33.40	31.00	21.28	1.46	1.10	0.76	17.11	16.02	15.95	16.60	16.39	10.50	9.79	28.46
1976	34.45	31.94	22.51	1.52	1.15	0.96	17.48	16.42	16.36	17.21	17.00	10.99	10.31	29.30
1977	35.49	32.88	23.74	1.57	1.20	1.16	17.86	16.82	16.76	17.81	17.62	11.49	10.83	30.15
1978	36.53	33.82	24.97	1.63	1.24	1.37	18.23	17.22	17.17	18.42	18.23	11.98	11.35	30.99
1979	37.58	34.76	26.20	1.68	1.29	1.57	18.61	17.62	17.57	19.03	18.85	12.47	11.87	31.83
1980	38.62	35.69	27.43	1.74	1.34	1.77	18.99	18.02	17.97	19.63	19.46	12.97	12.39	32.67
1981	38.56	36.05	28.24	1.74	1.60	2.04	19.26	18.29	18.25	19.67	19.49	13.23	12.66	32.97
1982	38.50	36.41	29.05	1.75	1.86	2.32	19.54	18.57	18.52	19.70	19.52	13.50	12.92	33.26
1983	38.44	36.76	29.86	1.76	2.12	2.59	19.81	18.84	18.80	19.73	19.56	13.76	13.19	33.56
1984	38.37	37.12	30.67	1.76	2.38	2.86	20.09	19.12	19.07	19.77	19.59	14.03	13.45	33.86
1985	38.31	37.48	31.48	1.77	2.64	3.13	20.36	19.39	19.35	19.80	19.62	14.29	13.72	34.15
1986	38.15	37.73	32.19	2.00	2.86	3.19	20.67	19.70	19.66	19.92	19.74	14.59	14.02	34.35
1987	37.99	37.99	32.90	2.24	3.08	3.25	20.98	20.01	19.97	20.04	19.87	14.89	14.32	34.55
1988	37.83	38.24	33.61	2.47	3.29	3.31	21.29	20.32	20.28	20.16	19.99	15.19	14.62	34.75
1989	37.67	38.50	34.32	2.70	3.51	3.37	21.60	20.63	20.59	20.28	20.11	15.49	14.92	34.95
1990	37.51	38.75	35.03	2.94	3.73	3.43	21.91	20.94	20.90	20.40	20.23	15.79	15.22	35.14
1991	37.51	38.75	35.03	2.94	3.73	3.43	21.91	20.94	20.90	20.40	20.23	15.79	15.22	35.14

TABLE 8.
ENERGY PRICES IN 1977 DOLLARS PER FUEL UNIT
FEA REGION VIII NORTH CENTRAL
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT. $/MKWH	COMM. ELECT. $/MKWH	IND. ELECT. $/MKWH	RES. N. GAS $/MCFT	COMM. N. GAS $/MCFT	IND. N. GAS $/MCFT	RES. DIST. $/BBL	COMM.: DIST.: $/BBL	IND. DIST. $/BBL	COMM. RESID. $/BBL	IND. RESID. $/BBL	RES. LPG $/BBL	IND. LPG $/BBL	IND. COAL $/MEST
1975	30.79	25.86	13.96	1.33	1.11	0.68	17.94	17.17	17.17	17.63	17.29	11.51	10.72	20.54
1976	30.97	26.28	15.09	1.41	1.19	0.94	18.38	17.51	17.55	18.05	17.71	11.88	11.08	21.83
1977	31.17	26.70	16.21	1.49	1.28	1.20	18.82	17.85	17.93	18.47	18.13	12.25	11.44	23.12
1978	31.36	27.11	17.33	1.58	1.36	1.45	19.25	18.19	18.31	18.88	18.55	12.62	11.80	24.40
1979	31.56	27.53	18.46	1.66	1.45	1.71	19.69	18.53	18.69	19.30	18.97	12.99	12.17	25.69
1980	31.76	27.95	19.58	1.75	1.53	1.97	20.13	18.86	19.07	19.71	19.39	13.37	12.53	26.98
1981	31.57	27.98	20.33	1.77	1.72	1.98	20.40	19.14	19.35	19.83	19.51	13.60	12.77	27.37
1982	31.39	28.01	21.08	1.79	1.90	1.98	20.68	19.41	19.62	19.94	19.62	13.84	13.00	27.77
1983	31.19	28.04	21.83	1.81	2.09	1.99	20.95	19.69	19.90	20.06	19.74	14.08	13.24	28.17
1984	31.00	28.07	22.58	1.84	2.28	2.00	21.23	19.96	20.17	20.17	19.85	14.32	13.48	28.56
1985	30.81	28.09	23.33	1.86	2.46	2.00	21.50	20.24	20.45	20.28	19.96	14.56	13.72	28.96
1986	31.21	28.71	24.67	2.05	2.71	2.25	21.80	20.53	20.74	20.49	20.17	14.85	14.02	29.30
1987	31.61	29.33	26.01	2.25	2.96	2.49	22.09	20.83	21.03	20.69	20.37	15.14	14.32	29.65
1988	32.01	29.95	27.35	2.44	3.20	2.74	22.39	21.12	21.33	20.89	20.57	15.43	14.62	30.00
1989	32.41	30.57	28.69	2.63	3.45	2.99	22.68	21.41	21.62	21.09	20.77	15.72	14.92	30.34
1990	32.81	31.18	30.03	2.83	3.70	3.23	22.97	21.70	21.91	21.30	20.98	16.01	15.22	30.69
1991	32.81	31.18	30.03	2.83	3.70	3.23	22.97	21.70	21.91	21.30	20.98	16.01	15.22	30.69

TABLE 9
ENERGY PRICES IN 1977 DOLLARS PER FUEL UNIT
FEA REGION IX WESTERN
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT. $/MKWH	COMM. ELECT. $/MKWH	IND. ELECT. $/MKWH	RES. N. GAS $/MCFT	COMM. N. GAS $/MCFT	IND. N. GAS $/MCFT	RES. DIST. $/BBL	COMM. DIST. $/BBL	IND. DIST. $/BBL	COMM. RESID. $/BBL	IND. RESID. $/BBL	RES. LPG $/BBL	IND. LPG $/BBL	IND. COAL $/MEST
1975	36.97	31.11	23.76	1.73	1.42	1.12	19.16	17.56	17.56	18.26	18.19	12.31	11.29	41.33
1976	39.13	33.56	26.37	1.92	1.56	1.46	19.43	17.84	17.84	18.33	18.27	12.60	11.60	39.90
1977	41.30	36.01	28.98	2.10	1.71	1.79	19.69	18.12	18.12	18.40	18.35	12.89	11.91	38.46
1978	43.46	38.46	31.59	2.28	1.85	2.13	19.96	18.40	18.40	18.47	18.43	13.18	12.22	37.03
1979	45.63	40.90	34.21	2.47	2.00	2.47	20.23	18.68	18.68	18.54	18.51	13.47	12.53	35.59
1980	47.79	43.35	36.82	2.65	2.14	2.80	20.49	18.96	18.96	18.61	18.59	13.76	12.84	34.15
1981	47.28	43.12	36.78	2.85	2.35	2.75	20.71	19.18	19.18	18.64	18.61	13.97	13.05	34.65
1982	46.77	42.89	36.74	3.06	2.55	2.70	20.93	19.40	19.40	18.66	18.64	14.19	13.26	35.14
1983	46.26	42.66	36.70	3.26	2.75	2.65	21.15	19.62	19.62	18.68	18.66	14.40	13.47	35.64
1984	45.74	42.43	36.67	3.46	2.95	2.60	21.37	19.84	19.84	18.71	18.69	14.61	13.68	36.13
1985	45.23	42.20	36.63	3.66	3.16	2.55	21.59	20.06	20.06	18.73	18.71	14.82	13.89	36.63
1986	45.27	42.52	37.14	3.70	3.19	2.70	21.86	20.33	20.33	18.85	18.83	15.15	14.22	37.12
1987	45.32	42.85	37.66	3.74	3.23	2.86	22.13	20.60	20.60	18.97	18.95	15.47	14.55	37.62
1988	45.36	43.17	38.17	3.78	3.27	3.01	22.39	20.86	20.86	19.10	19.07	15.80	14.87	38.11
1989	45.40	43.50	38.69	3.81	3.31	3.16	22.66	21.13	21.13	19.22	19.19	16.13	15.20	38.61
1990	45.44	43.82	39.20	3.85	3.34	3.31	22.92	21.39	21.39	19.34	19.32	16.45	15.53	39.10
1991	45.48	43.82	39.20	3.85	3.34	3.31	22.92	21.39	21.39	19.34	19.32	16.45	15.53	39.10

TABLE 10
ENERGY PRICES IN 1977 DOLLARS PER FUEL UNIT
FEA REGION X NORTHWESTERN
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT. $/MKWH	COMM. ELECT. $/MKWH	IND. ELECT. $/MKWH	RES. N. GAS $/MCFT	COMM. N. GAS $/MCFT	IND. N. GAS $/MCFT	RES. DIST. $/BBL	COMM. DIST. $/BBL	IND. DIST. $/BBL	COMM. RESID. $/BBL	IND. RESID. $/BBL	RES. LPG $/BBL	IND. LPG $/BBL	IND. COAL $/MEST
1975	15.91	16.66	6.16	2.37	1.78	1.17	18.77	17.17	17.11	17.77	17.91	11.91	10.98	24.01
1976	17.23	17.90	7.81	2.59	2.00	1.38	19.12	17.53	17.48	17.86	18.11	12.28	11.35	24.55
1977	18.55	19.13	9.47	2.80	2.22	1.59	19.46	17.89	17.85	17.94	18.31	12.65	11.72	25.10
1978	19.87	20.37	11.13	3.02	2.44	1.80	19.81	18.25	18.22	18.03	18.52	13.02	12.09	25.64
1979	21.19	21.60	12.79	3.24	2.66	2.01	20.15	18.61	18.59	18.11	18.72	13.39	12.47	26.19
1980	22.51	22.84	14.45	3.45	2.88	2.22	20.49	18.96	18.96	18.19	18.92	13.76	12.84	26.73
1981	22.52	22.77	14.81	3.46	2.88	2.22	20.71	19.18	19.18	18.22	18.94	13.97	13.05	28.56
1982	22.53	22.70	15.18	3.46	2.89	2.23	20.93	19.40	19.40	18.24	18.97	14.19	13.26	30.39
1983	22.54	22.62	15.54	3.46	2.89	2.23	21.15	19.62	19.62	18.27	18.99	14.40	13.47	32.22
1984	22.55	22.55	15.90	3.46	2.89	2.23	21.37	19.84	19.84	18.29	19.02	14.61	13.68	34.06
1985	22.56	22.48	16.26	3.46	2.89	2.23	21.59	20.06	20.06	18.31	19.04	14.82	13.89	35.89
1986	22.91	22.75	16.95	3.50	3.23	2.57	21.86	20.33	20.33	18.44	19.16	15.15	14.22	36.68
1987	23.25	23.01	17.65	3.54	3.57	2.91	22.13	20.60	20.60	18.56	19.28	15.47	14.55	37.47
1988	23.60	23.28	18.34	3.58	3.90	3.24	22.39	20.86	20.86	18.68	19.40	15.80	14.87	38.26
1989	23.94	23.54	19.04	3.62	4.24	3.58	22.66	21.13	21.13	18.80	19.52	16.13	15.20	39.06
1990	24.29	23.80	19.73	3.66	4.58	3.92	22.92	21.39	21.39	18.92	19.65	16.45	15.53	39.85
1991	24.29	23.80	19.73	3.66	4.58	3.92	22.92	21.39	21.39	18.92	19.65	16.45	15.53	39.85

TABLE 11
ENERGY PRICES IN 1977 DOLLARS PER MILLION BTU
FEA REGION I NEW ENGLAND
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT.	COMM. ELECT.	IND. ELECT.	RES. N. GAS	COMM. N. GAS	IND. N. GAS	RES. DIST.	COMM. DIST.	IND. DIST.	COMM. RESID.	IND. RESID.	RES. LPG	IND. LPG	IND. COAL
1975	14.53	14.15	10.35	3.37	2.79	2.36	3.44	3.05	3.05	2.33	2.34	3.89	3.32	1.26
1976	14.54	14.18	10.55	3.37	2.78	2.69	3.47	3.11	3.11	2.44	2.46	3.82	3.32	1.37
1977	14.54	14.22	10.75	3.37	2.77	3.01	3.50	3.17	3.17	2.56	2.58	3.74	3.31	1.47
1978	14.55	14.25	10.95	3.37	2.76	3.34	3.53	3.24	3.24	2.67	2.70	3.67	3.30	1.57
1979	14.56	14.29	11.15	3.37	2.75	3.66	3.56	3.30	3.30	2.78	2.82	3.59	3.30	1.67
1980	14.56	14.33	11.35	3.37	2.74	3.98	3.59	3.36	3.36	2.89	2.94	3.52	3.29	1.77
1981	14.52	14.32	11.51	3.53	2.90	3.78	3.61	3.38	3.38	2.90	2.95	3.57	3.34	1.79
1982	14.48	14.30	11.68	3.69	3.06	3.59	3.63	3.41	3.40	2.90	2.95	3.62	3.39	1.80
1983	14.44	14.29	11.84	3.84	3.21	3.39	3.66	3.43	3.43	2.90	2.96	3.67	3.45	1.82
1984	14.40	14.28	12.00	4.00	3.37	3.19	3.68	3.45	3.45	2.91	2.96	3.72	3.50	1.83
1985	14.36	14.27	12.17	4.15	3.52	2.99	3.70	3.47	3.47	2.91	2.96	3.77	3.55	1.85
1986	14.46	14.40	12.48	4.33	3.70	3.17	3.75	3.52	3.52	2.93	2.98	3.84	3.62	1.86
1987	14.56	14.53	12.78	4.50	3.87	3.34	3.79	3.56	3.56	2.95	3.00	3.90	3.68	1.87
1988	14.67	14.67	13.09	4.68	4.05	3.52	3.84	3.61	3.61	2.97	3.02	3.97	3.75	1.88
1989	14.77	14.80	13.40	4.85	4.22	3.69	3.89	3.66	3.65	2.99	3.04	4.04	3.82	1.89
1990	14.88	14.93	13.71	5.03	4.40	3.87	3.93	3.70	3.70	3.01	3.06	4.10	3.88	1.90
1991	14.88	14.93	13.71	5.03	4.40	3.87	3.93	3.70	3.70	3.01	3.06	4.10	3.88	1.90

TABLE 12
ENERGY PRICES IN 1977 DOLLARS PER MILLION BTU
FEA REGION II - NEW YORK/NEW JERSEY
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT.	COMM. ELECT.	IND. ELECT.	RES. N. GAS	COMM. N. GAS	IND. N. GAS	RES. DIST.	COMM. DIST.	IND. DIST.	COMM. RESID.	IND. RESID.	RES. LPG	IND. LPG	IND. COAL
1975	16.32	16.41	8.89	2.75	2.23	1.66	3.13	2.85	2.84	2.28	2.28	3.22	2.90	1.06
1976	16.20	16.45	8.90	2.82	2.30	1.71	3.24	2.96	2.95	2.42	2.44	3.29	2.99	1.18
1977	16.09	16.48	8.92	2.90	2.36	1.76	3.34	3.07	3.06	2.56	2.60	3.36	3.07	1.30
1978	15.96	16.52	8.93	2.97	2.42	1.80	3.44	3.18	3.17	2.70	2.76	3.43	3.15	1.42
1979	15.84	16.56	8.95	3.04	2.49	1.85	3.54	3.29	3.28	2.84	2.92	3.50	3.23	1.54
1980	15.72	16.59	8.97	3.12	2.55	1.90	3.64	3.40	3.39	2.98	3.08	3.56	3.31	1.66
1981	15.56	16.60	8.96	3.23	2.66	2.01	3.67	3.43	3.41	2.99	3.08	3.62	3.37	1.68
1982	15.41	16.60	8.95	3.34	2.77	2.12	3.69	3.46	3.44	2.99	3.09	3.68	3.43	1.69
1983	15.25	16.60	8.94	3.45	2.88	2.23	3.72	3.48	3.46	2.99	3.09	3.74	3.49	1.71
1984	15.09	16.60	8.93	3.55	2.99	2.34	3.75	3.51	3.49	3.00	3.09	3.79	3.55	1.72
1985	14.94	16.61	8.92	3.66	3.10	2.45	3.77	3.53	3.52	3.00	3.10	3.85	3.61	1.74
1986	14.94	16.77	9.08	3.80	3.24	2.59	3.82	3.58	3.56	3.02	3.12	3.92	3.67	1.75
1987	14.95	16.93	9.23	3.95	3.38	2.73	3.87	3.63	3.61	3.04	3.14	3.98	3.74	1.76
1988	14.96	17.10	9.38	4.09	3.52	2.87	3.91	3.67	3.66	3.06	3.15	4.05	3.81	1.77
1989	14.96	17.26	9.54	4.23	3.66	3.01	3.96	3.72	3.70	3.08	3.17	4.11	3.87	1.78
1990	14.97	17.43	9.69	4.37	3.80	3.15	4.01	3.77	3.75	3.10	3.19	4.18	3.94	1.79
1991	14.97	17.43	9.69	4.37	3.80	3.15	4.01	3.77	3.75	3.10	3.19	4.18	3.94	1.79

TABLE 13
ENERGY PRICES IN 1977 DOLLARS PER MILLION BTU
FEA REGION III MID-ATLANTIC
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT.	COMM. ELECT.	IND. ELECT.	RES. N. GAS	COMM. N. GAS	IND. N. GAS	RES. DIST.	COMM. DIST.	IND. DIST.	COMM. RESID.	IND. RESID.	RES. LPG	IND. LPG	IND. COAL
1975	12.24	11.38	8.02	2.12	1.81	1.19	3.06	2.84	2.82	2.27	2.23	2.90	2.74	0.81
1976	12.19	11.37	8.11	2.23	1.90	1.32	3.21	2.96	2.96	2.47	2.43	3.09	2.89	0.96
1977	12.14	11.35	8.21	2.35	1.99	1.45	3.36	3.08	3.11	2.67	2.62	3.28	3.04	1.11
1978	12.09	11.33	8.30	2.46	2.07	1.58	3.51	3.20	3.25	2.87	2.81	3.47	3.19	1.26
1979	12.05	11.31	8.40	2.57	2.16	1.72	3.67	3.33	3.39	3.07	3.00	3.66	3.35	1.40
1980	12.00	11.29	8.50	2.68	2.24	1.85	3.82	3.45	3.54	3.27	3.19	3.85	3.50	1.55
1981	12.09	11.41	8.74	2.79	2.36	1.96	3.84	3.47	3.56	3.27	3.20	3.91	3.56	1.57
1982	12.18	11.54	8.99	2.91	2.47	2.07	3.87	3.50	3.59	3.28	3.20	3.97	3.62	1.59
1983	12.27	11.66	9.24	3.02	2.58	2.19	3.90	3.53	3.62	3.28	3.20	4.03	3.68	1.60
1984	12.36	11.79	9.48	3.13	2.70	2.30	3.92	3.55	3.64	3.28	3.21	4.09	3.74	1.62
1985	12.45	11.91	9.73	3.25	2.81	2.41	3.95	3.58	3.67	3.29	3.21	4.15	3.79	1.64
1986	12.53	12.02	9.96	3.36	2.92	2.52	4.00	3.62	3.72	3.31	3.23	4.21	3.86	1.65
1987	12.61	12.13	10.20	3.47	3.03	2.64	4.04	3.67	3.76	3.33	3.25	4.28	3.93	1.66
1988	12.69	12.24	10.43	3.58	3.14	2.75	4.09	3.72	3.81	3.35	3.27	4.34	3.99	1.67
1989	12.77	12.35	10.66	3.69	3.25	2.86	4.13	3.76	3.85	3.36	3.29	4.41	4.06	1.67
1990	12.85	12.46	10.90	3.80	3.36	2.97	4.18	3.81	3.90	3.38	3.31	4.48	4.12	1.68
1991	12.85	12.46	10.90	3.80	3.36	2.97	4.18	3.81	3.90	3.38	3.31	4.48	4.12	1.68

TABLE 14
ENERGY PRICES IN 1977 DOLLARS PER MILLION BTU
FEA REGION IV SOUTH ATLANTIC
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT.	COMM. ELECT.	IND. ELECT.	RES. N. GAS	COMM. N. GAS	IND. N. GAS	RES. DIST.	COMM. DIST.	IND. DIST.	COMM. RESID.	IND. RESID.	RES. LPG	IND. LPG	IND. COAL
1975	9.01	9.44	5.81	1.64	1.30	0.91	3.08	2.84	2.82	2.02	2.05	2.74	2.53	0.97
1976	9.31	9.70	6.27	1.76	1.39	1.01	3.24	2.96	2.96	2.20	2.21	2.96	2.73	1.12
1977	9.60	9.97	6.73	1.88	1.48	1.11	3.40	3.08	3.10	2.38	2.38	3.19	2.93	1.28
1978	9.90	10.24	7.19	1.99	1.57	1.20	3.56	3.21	3.24	2.56	2.55	3.41	3.13	1.43
1979	10.19	10.50	7.65	2.11	1.66	1.30	3.73	3.33	3.39	2.74	2.72	3.64	3.33	1.58
1980	10.49	10.77	8.10	2.23	1.75	1.40	3.89	3.45	3.53	2.92	2.89	3.86	3.53	1.74
1981	10.50	10.75	8.29	2.36	1.88	1.54	3.91	3.48	3.56	2.92	2.89	3.92	3.59	1.76
1982	10.52	10.73	8.47	2.48	2.00	1.69	3.94	3.51	3.58	2.93	2.90	3.99	3.66	1.77
1983	10.53	10.72	8.66	2.60	2.12	1.83	3.97	3.53	3.61	2.93	2.90	4.05	3.72	1.79
1984	10.54	10.70	8.84	2.73	2.25	1.98	4.00	3.56	3.64	2.94	2.91	4.12	3.79	1.81
1985	10.56	10.68	9.02	2.85	2.37	2.13	4.02	3.59	3.67	2.94	2.91	4.18	3.85	1.83
1986	10.59	10.68	9.23	2.99	2.51	2.24	4.07	3.64	3.72	2.96	2.93	4.25	3.92	1.83
1987	10.63	10.68	9.43	3.12	2.64	2.36	4.12	3.69	3.77	2.98	2.95	4.33	3.99	1.84
1988	10.66	10.69	9.63	3.26	2.77	2.48	4.17	3.74	3.82	3.00	2.97	4.40	4.06	1.85
1989	10.69	10.69	9.83	3.39	2.91	2.60	4.23	3.79	3.87	3.02	2.99	4.47	4.13	1.86
1990	10.73	10.69	10.04	3.52	3.04	2.71	4.28	3.84	3.92	3.04	3.01	4.54	4.20	1.87
1991	10.73	10.69	10.04	3.52	3.04	2.71	4.28	3.84	3.92	3.04	3.01	4.54	4.20	1.87

TABLE 15
ENERGY PRICES IN 1977 DOLLARS PER MILLION BTU
FEA REGION V MIDWEST
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT.	COMM. ELECT.	IND. ELECT.	RES. N. GAS	COMM. N. GAS	IND. N. GAS	RES. DIST.	COMM. DIST.	IND. DIST.	COMM. RESID.	IND. RESID.	RES. LPG	IND. LPG	IND. COAL
1975	10.66	10.43	6.45	1.68	1.42	1.18	2.90	2.74	2.74	2.44	2.43	2.60	2.44	0.97
1976	10.75	10.54	6.71	1.79	1.51	1.26	2.99	2.83	2.83	2.58	2.56	2.75	2.59	1.08
1977	10.84	10.65	6.97	1.89	1.61	1.34	3.08	2.92	2.91	2.71	2.70	2.90	2.74	1.19
1978	10.93	10.76	7.23	1.99	1.70	1.42	3.18	3.00	3.00	2.85	2.83	3.04	2.88	1.30
1979	11.02	10.87	7.49	2.10	1.80	1.50	3.27	3.09	3.09	2.98	2.96	3.19	3.03	1.41
1980	11.11	10.98	7.75	2.20	1.89	1.58	3.36	3.18	3.18	3.11	3.09	3.34	3.18	1.52
1981	11.20	11.09	8.02	2.31	2.00	1.69	3.40	3.23	3.22	3.12	3.10	3.41	3.25	1.53
1982	11.29	11.20	8.29	2.42	2.11	1.80	3.45	3.27	3.27	3.12	3.10	3.48	3.32	1.54
1983	11.37	11.31	8.55	2.53	2.22	1.91	3.50	3.32	3.32	3.13	3.11	3.54	3.38	1.56
1984	11.46	11.42	8.82	2.64	2.33	2.02	3.54	3.37	3.37	3.14	3.11	3.61	3.45	1.57
1985	11.55	11.53	9.09	2.74	2.43	2.13	3.59	3.42	3.41	3.14	3.12	3.67	3.52	1.58
1986	11.63	11.63	9.35	2.94	2.63	2.32	3.65	3.47	3.47	3.16	3.14	3.75	3.59	1.59
1987	11.72	11.74	9.61	3.14	2.83	2.52	3.70	3.52	3.52	3.18	3.16	3.82	3.67	1.61
1988	11.80	11.84	9.87	3.33	3.02	2.71	3.75	3.58	3.57	3.20	3.18	3.90	3.74	1.62
1989	11.88	11.94	10.14	3.53	3.22	2.91	3.80	3.63	3.63	3.22	3.19	3.97	3.81	1.63
1990	11.97	12.05	10.40	3.73	3.42	3.11	3.86	3.68	3.68	3.24	3.21	4.05	3.88	1.64
1991	11.97	12.05	10.40	3.73	3.42	3.11	3.86	3.68	3.68	3.24	3.21	4.05	3.88	1.64

TABLE 16
ENERGY PRICES IN 1977 DOLLARS PER MILLION BTU
FEA REGION VI SOUTHWEST
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT.	COMM. ELECT.	IND. ELECT.	RES. N. GAS	COMM. N. GAS	IND. N. GAS	RES. DIST.	COMM. DIST.	IND. DIST.	COMM. RESID.	IND. RESID.	RES. LPG	IND. LPG	IND. COAL
1975	8.70	7.60	4.66	1.48	1.00	0.78	2.99	2.74	2.73	2.11	2.18	2.67	2.47	1.86
1976	9.71	8.66	5.86	1.55	1.06	1.00	3.11	2.86	2.85	2.28	2.33	2.82	2.62	1.77
1977	10.72	9.73	7.06	1.61	1.13	1.21	3.23	2.98	2.97	2.45	2.48	2.98	2.77	1.67
1978	11.73	10.79	8.25	1.68	1.19	1.43	3.35	3.10	3.09	2.61	2.63	3.13	2.92	1.58
1979	12.74	11.85	9.45	1.74	1.25	1.64	3.46	3.22	3.20	2.78	2.79	3.28	3.07	1.49
1980	13.75	12.91	10.65	1.80	1.31	1.86	3.58	3.34	3.32	2.95	2.94	3.43	3.22	1.40
1981	13.58	12.80	10.66	1.86	1.48	1.86	3.61	3.37	3.35	2.95	2.94	3.50	3.29	1.42
1982	13.41	12.68	10.68	1.91	1.65	1.87	3.64	3.40	3.38	2.96	2.95	3.56	3.35	1.44
1983	13.23	12.56	10.70	1.96	1.82	1.87	3.67	3.42	3.41	2.96	2.95	3.62	3.42	1.46
1984	13.06	12.44	10.72	2.01	1.99	1.88	3.69	3.45	3.43	2.97	2.96	3.69	3.49	1.48
1985	12.89	12.33	10.74	2.06	2.16	1.88	3.72	3.48	3.46	2.97	2.96	3.75	3.55	1.50
1986	13.03	12.52	11.08	2.20	2.39	2.11	3.77	3.53	3.51	2.99	2.98	3.83	3.63	1.52
1987	13.18	12.72	11.41	2.34	2.62	2.35	3.82	3.58	3.56	3.01	3.00	3.90	3.70	1.54
1988	13.32	12.91	11.74	2.48	2.86	2.58	3.87	3.63	3.61	3.03	3.02	3.98	3.77	1.56
1989	13.46	13.11	12.08	2.63	3.09	2.81	3.92	3.68	3.66	3.05	3.04	4.05	3.84	1.58
1990	13.60	13.31	12.41	2.77	3.32	3.04	3.97	3.73	3.71	3.07	3.06	4.12	3.92	1.59
1991	13.60	13.31	12.41	2.77	3.32	3.04	3.97	3.73	3.71	3.07	3.06	4.12	3.92	1.59

TABLE 17
ENERGY PRICES IN 1977 DOLLARS PER MILLION BTU
FEA REGION VII: CENTRAL
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT.	COMM. ELECT.	IND. ELECT.	RES. N. GAS	COMM. N. GAS	IND. N. GAS	RES. DIST.	COMM. DIST.	IND. DIST.	COMM. RESID.	IND. RESID.	RES. LPG	IND. LPG	IND. COAL
1975	9.79	9.09	6.24	1.42	1.07	0.74	2.94	2.75	2.74	2.64	2.61	2.62	2.44	1.26
1976	10.10	9.36	6.60	1.47	1.11	0.93	3.00	2.82	2.81	2.74	2.70	2.74	2.57	1.30
1977	10.40	9.64	6.96	1.53	1.16	1.13	3.07	2.89	2.88	2.83	2.80	2.86	2.70	1.34
1978	10.71	9.91	7.32	1.58	1.21	1.33	3.13	2.96	2.95	2.93	2.90	2.99	2.83	1.38
1979	11.01	10.19	7.68	1.63	1.26	1.52	3.19	3.02	3.02	3.03	3.00	3.11	2.96	1.41
1980	11.32	10.46	8.04	1.69	1.30	1.72	3.26	3.09	3.09	3.12	3.10	3.23	3.09	1.45
1981	11.30	10.57	8.28	1.69	1.55	1.98	3.31	3.14	3.13	3.13	3.10	3.30	3.16	1.47
1982	11.28	10.67	8.51	1.70	1.81	2.25	3.35	3.19	3.18	3.13	3.11	3.37	3.22	1.48
1983	11.26	10.77	8.75	1.71	2.06	2.51	3.40	3.23	3.23	3.14	3.11	3.43	3.29	1.49
1984	11.25	10.88	8.99	1.71	2.31	2.78	3.45	3.28	3.27	3.14	3.12	3.50	3.35	1.50
1985	11.23	10.98	9.23	1.72	2.56	3.04	3.50	3.33	3.32	3.15	3.12	3.56	3.42	1.52
1986	11.18	11.06	9.44	1.95	2.77	3.10	3.55	3.38	3.37	3.17	3.14	3.64	3.50	1.53
1987	11.13	11.13	9.64	2.17	2.99	3.16	3.60	3.44	3.43	3.19	3.16	3.71	3.57	1.54
1988	11.09	11.21	9.85	2.40	3.20	3.22	3.66	3.49	3.48	3.21	3.18	3.79	3.65	1.54
1989	11.04	11.28	10.06	2.63	3.41	3.27	3.71	3.54	3.53	3.23	3.20	3.86	3.72	1.55
1990	10.99	11.36	10.27	2.85	3.62	3.33	3.76	3.60	3.59	3.25	3.22	3.94	3.79	1.56
1991	10.99	11.36	10.27	2.85	3.62	3.33	3.76	3.60	3.59	3.25	3.22	3.94	3.79	1.56

TABLE 18
ENERGY PRICES IN 1977 DOLLARS PER MILLION BTU
FEA REGION VIII: NORTH CENTRAL
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT.	COMM. ELECT.	IND. ELECT.	RES. N. GAS	COMM. N. GAS	IND. N. GAS	RES. DIST.	COMM. DIST.	IND. DIST.	COMM. RESID.	IND. RESID.	RES. LPG	IND. LPG	IND. COAL
1975	9.02	7.58	4.09	1.29	1.08	0.66	3.08	2.95	2.95	2.80	2.75	2.87	2.67	0.91
1976	9.08	7.70	4.42	1.37	1.16	0.91	3.16	3.01	3.01	2.87	2.82	2.96	2.76	0.97
1977	9.13	7.82	4.75	1.45	1.24	1.16	3.23	3.06	3.08	2.94	2.88	3.06	2.85	1.03
1978	9.19	7.95	5.08	1.53	1.32	1.41	3.31	3.12	3.14	3.00	2.95	3.15	2.94	1.08
1979	9.25	8.07	5.41	1.62	1.40	1.66	3.38	3.18	3.21	3.07	3.02	3.24	3.03	1.14
1980	9.31	8.19	5.74	1.70	1.48	1.91	3.46	3.24	3.27	3.14	3.08	3.33	3.12	1.20
1981	9.25	8.20	5.96	1.72	1.67	1.92	3.50	3.29	3.32	3.15	3.10	3.39	3.18	1.22
1982	9.20	8.21	6.18	1.74	1.85	1.92	3.55	3.33	3.37	3.17	3.12	3.45	3.24	1.23
1983	9.14	8.22	6.40	1.76	2.03	1.93	3.60	3.38	3.42	3.19	3.14	3.51	3.30	1.25
1984	9.09	8.23	6.62	1.78	2.21	1.94	3.64	3.43	3.46	3.21	3.16	3.57	3.36	1.27
1985	9.03	8.23	6.84	1.80	2.39	1.94	3.69	3.47	3.51	3.23	3.18	3.63	3.42	1.29
1986	9.15	8.42	7.23	1.99	2.63	2.18	3.74	3.52	3.56	3.26	3.21	3.70	3.50	1.30
1987	9.26	8.60	7.62	2.18	2.87	2.42	3.79	3.58	3.61	3.29	3.24	3.78	3.57	1.32
1988	9.38	8.78	8.02	2.37	3.11	2.66	3.84	3.63	3.66	3.32	3.27	3.85	3.65	1.33
1989	9.50	8.96	8.41	2.56	3.35	2.90	3.89	3.68	3.71	3.36	3.30	3.92	3.72	1.35
1990	9.62	9.14	8.80	2.74	3.59	3.14	3.94	3.73	3.76	3.39	3.34	3.99	3.79	1.36
1991	9.62	9.14	8.80	2.74	3.59	3.14	3.94	3.73	3.76	3.39	3.34	3.99	3.79	1.36

TABLE 19
ENERGY PRICES IN 1977 DOLLARS PER MILLION BTU
FEA REGION IX WESTERN
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT.	COMM. ELECT.	IND. ELECT.	RES. N. GAS	COMM. N. GAS	IND. N. GAS	RES. DIST.	COMM. DIST.	IND. DIST.	COMM. RESID.	IND. RESID.	RES. LPG	IND. LPG	IND. COAL
1975	10.83	9.12	6.96	1.68	1.37	1.09	3.29	3.01	3.01	2.90	2.89	3.07	2.82	1.84
1976	11.47	9.84	7.73	1.86	1.52	1.42	3.33	3.06	3.06	2.92	2.91	3.14	2.89	1.77
1977	12.10	10.55	8.49	2.04	1.66	1.74	3.38	3.11	3.11	2.93	2.92	3.21	2.97	1.71
1978	12.74	11.27	9.26	2.22	1.80	2.07	3.43	3.16	3.16	2.94	2.93	3.29	3.05	1.65
1979	13.37	11.99	10.02	2.40	1.94	2.40	3.47	3.21	3.21	2.95	2.94	3.36	3.12	1.58
1980	14.01	12.71	10.79	2.57	2.08	2.72	3.52	3.26	3.26	2.96	2.96	3.43	3.20	1.52
1981	13.86	12.64	10.78	2.77	2.28	2.67	3.56	3.29	3.29	2.96	2.96	3.48	3.25	1.54
1982	13.71	12.57	10.77	2.97	2.48	2.63	3.59	3.33	3.33	2.97	2.96	3.54	3.31	1.56
1983	13.56	12.50	10.76	3.16	2.67	2.58	3.63	3.37	3.37	2.97	2.97	3.59	3.36	1.58
1984	13.41	12.43	10.75	3.36	2.87	2.53	3.67	3.41	3.41	2.98	2.97	3.64	3.41	1.61
1985	13.26	12.37	10.74	3.56	3.07	2.48	3.71	3.44	3.44	2.98	2.98	3.70	3.46	1.63
1986	13.27	12.46	10.89	3.59	3.10	2.63	3.75	3.49	3.49	3.00	3.00	3.78	3.55	1.65
1987	13.28	12.56	11.04	3.63	3.14	2.77	3.80	3.54	3.54	3.02	3.01	3.86	3.63	1.67
1988	13.29	12.65	11.19	3.67	3.17	2.92	3.84	3.58	3.58	3.04	3.03	3.94	3.71	1.69
1989	13.31	12.75	11.34	3.70	3.21	3.07	3.89	3.63	3.63	3.06	3.05	4.02	3.79	1.72
1990	13.32	12.84	11.49	3.74	3.25	3.21	3.94	3.67	3.67	3.08	3.07	4.10	3.87	1.74
1991	13.32	12.84	11.49	3.74	3.25	3.21	3.94	3.67	3.67	3.08	3.07	4.10	3.87	1.74

TABLE 20
ENERGY PRICES IN 1977 DOLLARS PER MILLION BTU
FEA REGION X NORTHWESTERN
(PRICES ASSUMED CONSTANT FROM 1990 ONWARD)

	RES. ELECT.	COMM. ELECT.	IND. ELECT.	RES. N. GAS	COMM. N. GAS	IND. N. GAS	RES. DIST.	COMM. DIST.	IND. DIST.	COMM. RESID.	IND. RESID.	RES. LPG	IND. LPG	IND. COAL
1975	4.66	4.88	1.80	2.30	1.73	1.13	3.22	2.95	2.94	2.83	2.85	2.97	2.74	1.07
1976	5.05	5.25	2.29	2.51	1.94	1.34	3.28	3.01	3.00	2.84	2.88	3.06	2.83	1.09
1977	5.44	5.61	2.78	2.72	2.16	1.54	3.34	3.07	3.06	2.85	2.91	3.15	2.92	1.12
1978	5.82	5.97	3.26	2.93	2.37	1.75	3.40	3.13	3.13	2.87	2.95	3.25	3.02	1.14
1979	6.21	6.33	3.75	3.14	2.58	1.95	3.46	3.19	3.19	2.88	2.98	3.34	3.11	1.16
1980	6.60	6.69	4.24	3.35	2.80	2.16	3.52	3.26	3.26	2.89	3.01	3.43	3.20	1.19
1981	6.60	6.67	4.34	3.36	2.80	2.16	3.56	3.29	3.29	2.90	3.01	3.48	3.25	1.27
1982	6.60	6.65	4.45	3.36	2.80	2.16	3.59	3.33	3.33	2.90	3.02	3.54	3.31	1.35
1983	6.61	6.63	4.55	3.36	2.80	2.16	3.63	3.37	3.37	2.91	3.02	3.59	3.36	1.43
1984	6.61	6.61	4.66	3.36	2.81	2.17	3.67	3.41	3.41	2.91	3.02	3.64	3.41	1.51
1985	6.61	6.59	4.76	3.36	2.81	2.17	3.71	3.44	3.44	2.91	3.03	3.70	3.46	1.59
1986	6.71	6.67	4.97	3.40	3.14	2.49	3.75	3.49	3.49	2.93	3.05	3.78	3.55	1.63
1987	6.81	6.74	5.17	3.44	3.46	2.82	3.80	3.54	3.54	2.95	3.07	3.86	3.63	1.67
1988	6.92	6.82	5.38	3.48	3.79	3.15	3.84	3.58	3.58	2.97	3.09	3.94	3.71	1.70
1989	7.02	6.90	5.58	3.52	4.12	3.48	3.89	3.63	3.63	2.99	3.11	4.02	3.79	1.74
1990	7.12	6.98	5.78	3.56	4.44	3.80	3.94	3.67	3.67	3.01	3.12	4.10	3.87	1.77
1991	7.12	6.98	5.78	3.56	4.44	3.80	3.94	3.67	3.67	3.01	3.12	4.10	3.87	1.77

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